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76

INTEGRATED COASTAL MANAGEMENT FOR THE ACHIEVEMENT OF THE AICHI BIODIVERSITY TARGETS

Practical Guidance for Implementation Based on Experience and Lessons Learned from Coastal and Ocean Governance in the Seas of East Asia

UNEP

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LIST OF ABBREVIATIONS AND ACRONYMS

CAM	Coastal Area Management
CBD	Convention on Biological Diversity
CBM	Community-based Management
COP 10	10th meeting of the Conference of the Parties
CRM	Coastal Resource Management
CSIP	Coastal Strategy Implementation Plan
CZM	Coastal Zone Management
EA	Ecosystem Approach
EARL	East Asia Response Limited (now the Oil Spill Response Limited or OSRL)
EBA	Ecosystem-based Adaptation
EBM	Ecosystem-based Management
EEZ	Economic Exclusive Zone
EIA	Environmental Impact Assessment
EM	Ecosystem Management
FRM	Fisheries Resource Management
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESAMP	Group of Experts on the Scientific Aspects of Marine Environmental Protection
GIS	Geographic Information System
GPA	Global Plans of Action
ICAM	Integrated Coastal Area Management
ICM	Integrated Coastal Management
ICOM	Integrated Coastal and Ocean Management
ICZM	Integrated Coastal Zone Management
IIMS	Integrated Information Management System
IMCAM	Integrated Marine and Coastal Area Management
IMO	International Maritime Organization
IWRM	Integrated Water Resource Management
LME	Large Marine Ecosystem
MARPOL	International Convention for the Prevention of Pollution from Ships
MERIT	Marine Environmental Research and Innovative Technology
MPA	Marine Protected Area

MPP-EAS	Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
MSP	Marine Spatial Planning
NBSAP	National Biodiversity Strategies and Action Plans
OPRC	Oil Spill Preparedness, Response and Cooperation
PDCA	Plan–Do–Check–Act
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PMO	Programme Management Office
PNLG	PEMSEA Network of Local Governments for Sustainable Coastal Development
RA	Rapid Appraisal
Rio+20	Conference 2012 United Nations Conference on Sustainable Development (in Rio de Janeiro, Brazil)
SCDF	Sustainable Coastal Development Framework
SDS–SEA	Sustainable Development Strategy for the Seas of East Asia
SGP	Small Grants Programme
SOC	State of the Coasts
SOI	Sustainable Ocean Initiative
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WRM	Water Resource Management
WSSD	World Summit on Sustainable Development

FOREWORD BY THE EXECUTIVE SECRETARY OF THE CBD

There is no question that human activities are placing unsustainable pressures on ocean resources. At the same time, global-scale drivers such as climate change are exacerbating the impacts of these pressures, undermining the ability of marine and coastal ecosystems to provide the services upon which we all depend.

Traditionally, oceans were managed in a sector-by-sector basis, with different regulatory bodies and processes governing different activities and resources. However, the dynamic and highly interconnected nature of marine and coastal ecosystems, which do not operate according to sectoral distinctions, have laid bare some of the inherent shortcomings of an overreliance on uncoordinated sectoral management approaches.

In this regard, integrated marine and coastal area management (IMCAM) arose as a paradigm to address the inherent shortcomings of sectoral governance approaches in marine and coastal areas. IMCAM is grounded in the principle of the ecosystem approach, which focuses on approaches that encompass the essential structure, processes, functions and interactions among organisms and their environment, and also recognizes that humans and their cultural diversity are an integral component of ecosystems.

IMCAM is nothing new, having been enshrined at the global level through the United Nations Conference on Environment and Development (UNCED) in 1992 and integrated as one of the key elements of Agenda 21 with regards to marine and coastal resources.

Soon after, IMCAM was incorporated as a central element of the implementation of the Convention on Biological Diversity (CBD). The Parties to the CBD recognized early on that IMCAM approaches were among the most effective tools for the conservation and sustainable use of marine and coastal biodiversity. This recognition was already evident at the second meeting of the Conference of the Parties (COP), in 1995, when the Parties encouraged the use of IMCAM as the most suitable framework for addressing human impacts on marine and coastal biological diversity and for promoting conservation and sustainable use of this biodiversity (decision II/10). Subsequently, IMCAM was adopted as the first of the five key programme elements of the programme of work on marine and coastal biodiversity (decision IV/5), a decision that was reiterated in 2004 (decision VII/5), when implementation of IMCAM was again adopted as the first programme element of the elaborated programme of work on marine and coastal biodiversity.

The Conference of the Parties has also recognized through a number of decisions that there is an urgent need for capacity development to enable developing country Parties to apply IMCAM, including through tools such as marine spatial planning. In this regard, integrated approaches are an important element of the Sustainable Ocean Initiative (SOI), a global capacity development partnership coordinated by the CBD Secretariat, and have been addressed through various SOI activities such national- and regional-level capacity development workshops.

Since 1992, we have gained significant experience in IMCAM, providing important lessons learned about its application in a range of contexts. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has been at the forefront of advancing IMCAM implementation and has been critical to facilitating uptake and effective implementation in the Seas of East Asia, leading to tangible benefits for ecosystems and coastal communities

This technical series report presents an IMCAM model that was developed and tested by PEMSEA. It represents a paradigm shift in terms of framework,

processes and methodology, having redefined the concept of coastal and ocean governance from a previously reactive approach to one that is comprehensive, interactive, area-wide and proactive. This report was prepared as PEMSEA's contribution to the capacity development efforts of SOI.

The CBD Secretariat greatly appreciates PEMSEA's collaboration in supporting the implementation of the Convention and contributing to SOI's capacity development efforts, including through the preparation of this report, and looks forward to working further with various regional partners, such as regional seas organizations and other regional initiatives, to enhance the capacity of Parties to conserve and sustainably use marine and coastal biodiversity.

Braulio Ferreira de Souza Dias
Executive Secretary
Convention on Biological Diversity

FOREWORD BY THE EXECUTIVE DIRECTOR OF PEMSEA

On behalf of the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), I would like to express our sincere appreciation to the Secretariat of the Convention on Biological Diversity for the opportunity to collaborate on this most important endeavour. I would also like to congratulate Dr. Chua Thia-Eng for sharing his knowledge and experience through this publication and for his untiring commitment to advancing the understanding, development and application of integrated coastal management (ICM) in support of targets and goals for marine biodiversity conservation and sustainable ocean development at the global level with on-the-ground benefits at the local level.

When PEMSEA's first phase was launched in 1993, pilot ICM sites were set up in Xiamen, China and Batangas Bay, Philippines. The pilot projects, covering some 286 kilometres of coastline, were primarily aimed at the prevention and management of marine pollution. After more than two decades, ICM programmes are now being implemented in 13 countries in partnership with more than 40 local governments across the East Asian region. Such programmes address a full gamut of management issues, including climate change adaptation, disaster risk reduction, habitat restoration and management, and sustainable fisheries and livelihoods.. These are just a few of the challenges that local governments, coastal communities and households continue to face on a daily basis and why PEMSEA remains committed to fostering, facilitating and coordinating integrated management solutions that bring about change to East Asia's coasts and oceans.

It is our ardent hope that this publication will provide the necessary practical guidance to policymakers and decision makers at global, regional and national levels on the application of ICM to achieve the Aichi Biodiversity Targets. We trust that the experience and methodologies that are shared in this document will prove valuable to the design and application of innovative policies, strategies and action programmes for achieving the Aichi Biodiversity Targets as well as for mainstreaming them into the economic development agendas of both national and local governments.

Stephen Adrian Ross
Executive Director and Chief Technical Officer
PEMSEA Resource Facility
Quezon City, Philippines

PREFACE

One of the most difficult challenges faced by environmental managers is to translate national commitments to multilateral environmental agreements, such as those related to biodiversity conservation, pollution management or climate change, into practical and prioritized action plans to be implemented at various levels of government. Obviously, just enacting national legislation is not enough. In addition to strong political commitment and budgetary allocations at national and local levels, there is also the need for public support and stakeholder participation on the ground. More importantly, is the availability of scientific and management capabilities to translate national obligations to feasible strategies and action plans that can be implemented by local authorities. Such environmental issues must first be accepted as part of the priority agenda of the government. To this end, the local government can and must play a primary role, as management actions need to be implemented at the ground level.

This guidance document builds upon the concept and working modality of integrated coastal management (ICM), a system developed through the efforts of the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), which the undersigned had the opportunity to serve since its establishment in 1993. The ICM system provides a holistic management framework, planning and implementation processes to address major environmental concerns in a systematic, integrated and sequential fashion. This guiding document attempts to demonstrate how the ICM approach and methodology can be applied to achieving the vision and mission of the Strategic Plan for Biodiversity 2011-2020, including its Aichi Biodiversity Targets.

Local environmental planning and management capacity is critical, and should be developed as the priority agenda, while learning-by doing continues to play an important role for all of those involved.

Chua, Thia-Eng
Chair Emeritus
East Asian Seas Partnerships Council
Partnerships in Environmental Management
for the Seas of East Asia (PEMSEA)

BIOGRAPHICAL NOTE

MR. CHUA THIA-ENG

Mr. Chua Thia-Eng retired from the United Nations in 2008. He currently serves as Chair Emeritus, East Asian Seas Partnership Council of the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA); as member of the Global Forum for Coasts, Islands and Oceans; as member of the Governing Board, International Ocean Institute; as member of the International Academic Advisory Committee for Coastal and Ocean Management Institute of Xiamen University, China; and as member of the Advisory Committee for the establishment of the ASEAN-China College of Marine Science, Xiamen University Malaysia. He received his Doctorate of Philosophy (1971) from the University of Singapore and bachelor degree from Nanyang University, Singapore (1964).

Mr. Thia-Eng served as a member of the academic staff of the National University of Singapore, Universiti Sains Malaysia and University of the Philippines in the Visayas; as visiting professor of Xiamen University; as external examiner for graduate theses/programmes; as well as in various other capacities with United Nations agencies and international and regional organizations, including the Food and Agriculture Organization; the International Center for Living Aquatic Resources Management; Global Environment Facility/United Nations Development Programme/International Maritime Organization/PEMSEA Programme; PEMSEA Resource Facility and Chair of East Asian Partnership Council; the Ocean Policy Research Foundation of Japan; World Bank; United Nations Development Programme; Convention on Biological Diversity; USAID; Swedish International Development Cooperation Agency/Department for Research Cooperation; and Exxon. He also served as associate editor, executive editor and editor of the *Journal of Coast and Ocean Management, Tropical Coasts* and *Ocean Policy Studies* (Japan), respectively. He publishes scientific papers, articles, reports and books.

He was the founding President of the Malaysian Marine Science Society and the Asian Fisheries Society. He served as the Co-Chair of the First World Fisheries Congress held in Athens. He won the First Gold Medal Award (1995) and Honorary Membership Award (1998) of the Asian Fisheries Society, and the Honorary Life Membership Award (1994) of the Malaysian Fishery Society. He was a member of the UN sponsored Group of Experts on Marine Pollution (GESAMP, 1991-1993).

In recognition of his work, the State Council of the People's Republic of China conferred him the prestigious *Friendship Award* in 1997. The Royal Government of Cambodia conferred him the *Sahak Metrey Medal* in 2002. In 2006, he was recognized as one of the outstanding alumni of the National University of Singapore for his work in integrated coastal management. In 2011, he was conferred *Honorary Citizen of Xiamen*, China. In 2013, the library of the PEMSEA Resource Facility in Manila was named after him in recognition of his contribution to PEMSEA.

EXECUTIVE SUMMARY

At the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD) in Nagoya, Japan, the Parties adopted a 10-year Strategic Plan for Biodiversity 2011-2020 to achieve 20 Aichi Biodiversity Targets. Achieving these strategic global targets will require national commitments and actions that should be made at the ground level. This is an ambitious and challenging task, considering the diverse social, political and economic conditions at the local level of governance as well as the management complexities in forging interagency cooperation, harmonizing multiple use conflicts, building stakeholders' consensus and participation, securing financial support and, last but not least, building local competence to plan and manage the use of biodiversity resources in a holistic and sustainable manner.

The Conference of Parties to the CBD recognized the need to adopt an integrated management approach in the implementation of the Strategic Plan for Biodiversity 2011-2020. The ecosystem approach (EA) has been suggested to provide the over-arching ecological principles to guide planning and management measures. Integrated marine and coastal area management (IMCAM) and marine spatial planning (MSP) have been suggested as the possible tools.

Significant experience has been gained in the implementation of integrated marine and coastal area management or integrated coastal management (ICM)[1] in different areas around the world. In particular, the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has been focusing on the promotion of coastal and ocean governance in the East Asian Seas region (Annex). At the sub-national level, PEMSEA has been able to draw upon an array of coastal and marine management tools—including those mentioned above—and has formulated these into an ICM system through testing, verification and standardization of the varied management practices. The ICM system utilizes a common governance framework and cyclical planning and partnership-building processes for addressing a multitude of environmental and sustainable development challenges, including those concerning biodiversity. It also espouses the adaptive management approach, where management policy and practices are continuously modified and improved to cope with new management challenges. The ICM system addresses most of the Aichi Biodiversity Targets under its conservation action programmes. As such, experience in implementing ICM, in particular PEMSEA's experience in the East Asian Seas region, is pertinent for achieving the Aichi Biodiversity Targets

The general purpose of this document is to provide practical guidance to coastal management practitioners, biodiversity conservationists, especially those at the local level, and those interested in coastal and ocean governance in the application of the ICM approach to achieve the Aichi Targets. A complementary objective is to provide insights on national upscaling of ICM practices.

This guidance document is divided into seven sections. The Executive Summary provides an overview of this document. Section 1 briefly discusses the CBD Strategic Plan for Biodiversity 2011-2020 and the background for the preparation of this guidance document. Section 2 gives an introduction to the concept and methodology of ICM. Section 3 explores the possible contributions of ICM in achieving the vision and mission of the Strategic Plan. Section 4 presents a set of practical guidelines for addressing the Aichi Targets through ICM implementation and its scaling-up. Section 5 attempts to show how the Aichi

1 The terms, "integrated marine and coastal area management (IMCAM)", as described in annex I to decision V17 (Programme Element 1), and "integrated coastal management (ICM)" as used in PEMSEA's management approach, are used interchangeably in this document. This approach draws on the conclusion, as mentioned later in this document, that the general concepts and principles of IMCAM and ICM, in addition to those of integrated coastal zone management (ICZM), are largely similar, although operational modality might vary somewhat in terms of emphasis, application, issues addressed, geographical coverage, as well as the local, national and regional conditions in which these tools are to be applied (Clark, 1996; Cicin-Sain and Knecht 1998; Chua, 2006).

Targets could be mainstreamed into local, national and regional implementation of coastal and marine management programmes. Section 6 provides a description of implementation challenges. Lastly, Section 7 summarizes the key conclusions.

1. INTRODUCTION

This section introduces the purpose of the CBD's Strategic Plan for Biodiversity 2011-2020 (hereinafter "the Strategic Plan") and its Aichi Biodiversity Targets (hereinafter "Aichi Targets"), the scope of coverage of biodiversity issues and their links to on-the-ground implementation as well as possible implementation challenges. Environmental and coastal management approaches and methodologies that can be applied to achieve the Strategic Plan and the Aichi Targets are briefly introduced, with special reference to marine spatial planning, ecosystem-based management and integrated coastal management.

1.1 STRATEGIC PLAN FOR BIODIVERSITY 2011-2020 AND AICHI BIODIVERSITY TARGETS

The three main goals of Convention on Biological Diversity (CBD) are: the conservation of biodiversity; the sustainable use of the components of biodiversity; and the sharing of benefits arising from the commercial as well as other utilization of genetic resources in a fair and equitable way. In fact, these goals are closely related and in line with the principles and objectives of sustainable development, which were adopted at the United Nations Conference on Environment and Development (UNCED) in 1992. Similar CBD goals were reiterated at the World Summit on Sustainable Development (WSSD) in 2002, and some of the CBD goals/targets were included in the Plan of Implementation of the summit. Some elements of the Strategic Plan have also been emphasized in the outcome document, "*The Future We Want*" , of the 2012 United Nations Conference on Sustainable Development or the Rio +20 Conference (www.uncsd2012.org/thefuturewewant.html), held in Rio de Janeiro, Brazil.

In line with the main goals of the CBD, the tenth meeting of the Conference of Parties (COP 10), in October 2010 in Nagoya, Japan, adopted a 10-year Strategic Plan for Biodiversity 2011-2020 to achieve 20 specific Aichi Biodiversity Targets grouped accordingly under five goals (Box 1.1). In addition to promoting biodiversity protection and conservation, the Strategic Plan, on the one hand, aims to address the underlying causes of biodiversity loss (Strategic Goal A), reduce human pressures on biodiversity (Strategic Goal B), and safeguard ecosystems, species and genetic resources (Strategic Goal C); on the other hand, the Strategic Plan also aims to promote sustainable use of biodiversity resources and enhance the benefits of ecosystem services (Strategic Goals B and D). Moreover, the Strategic Plan lays out practicable targets and approaches in terms of capacity development, knowledge management and participatory planning, which are essential for implementing NBSAPs (Strategic Goal E).

The Aichi Biodiversity Targets[2] set time-bound performance indicators for achieving several set of objectives, particularly in increasing public awareness of the values and sustainable use of biodiversity (Target 1); integrating biodiversity values into national development and poverty reduction action plans (Target 2); undertaking incentive reforms (Target 3); ensuring sustainable production and consumption (Target 4); reducing habitat loss (Target 5); implementing sustainable management of fish and invertebrate stocks and aquatic plants (Target 6), forestry, agriculture and aquaculture (Target 7); reducing pollution (Target 8); preventing and controlling invasive alien species (Target 9); reducing pressures on vulnerable ecosystems (Target 10); increasing and improving the management of protected areas (Target 11); preventing species extinction (Target 12); maintaining genetic diversity (Target 13); safeguarding ecosystems and essential services (Target 14); restoring ecosystems and enhancing resilience (Target 15); entry into force and implementing the Nagoya Protocol (Target 16);

2 https://www.cbd.int/sp/targets/

adopting National Biodiversity Strategies and Action Plans (NBSAPs)(Target 17); respecting traditional knowledge (Target 18); sharing, applying and improving knowledge on biodiversity conservation (Target 19) and increasing financial resources from all sources for biodiversity protection, conservation and sustainable use (Target 20) (Box 1.1). While the Aichi Targets cover a wide range of conservation concerns, encompassing the health of ecosystems from land to sea, three of them (Targets 6, 10 and 11) are directly pertinent to coastal and marine biodiversity.

Box 1.1 The Strategic Plan for Biodiversity 2011-2020 and Aichi Biodiversity Targets

The five strategic goals under the Strategic Plan penned during COP 10 are as follows:

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3: By 2020, at the latest, incentives—including subsidies—harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the convention and other relevant international obligations, taking into account national socio economic conditions.

Target 4: By 2020, at the latest, governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8: By 2020, pollution, including those from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized to maintain their integrity and function.

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11: By 2020, at least 17 per-cent of terrestrial and inland water, and 10 per-cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.

Target 12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives-- including other socio-economically as well as culturally valuable species--is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihood and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per-cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational and consistent with national legislation.

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Target 17: By 2015 each party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by the parties.

The oceans cover 70 per cent of the planet's surface area, with the coastal zone serving as the interface between the land and the seas. The riverine systems, meanwhile, play a critical role in connecting the watershed with the coastal seas, further augmenting the diversity of habitats, including mudflats, estuaries, mangroves, coral reefs and sea-grass beds. The interconnectivity of these habitats supports an abundant marine life and sustains substantial renewable marine living resources, the exploitation of which has traditionally provided food, medicines and employment for coastal communities. The Conference of the Parties to the CBD set clear targets to achieve long-term conservation and management of coastal and marine habitats especially in the management of marine protected areas (MPAs) in addition to the sustainable use of marine resources (decision X/29). The purpose is to safeguard marine and coastal biodiversity, marine ecosystem services and sustainable livelihoods, in addition to encouraging the necessary adaptation to the impacts of climate change.

In summary, COP 10 agreed on a new Strategic Plan for Biodiversity 2011–2020, the key elements of which are enumerated as the 20 Aichi Biodiversity Targets. Essentially, the Aichi Targets aim to cut the rate of natural habitat loss by half, conserve 17 per cent of terrestrial and inland water areas, conserve 10 per cent of marine and coastal areas, and restore up to 15 per cent of biodiversity through each Party's implementation of a revised NBSAP by 2015. The NBSAP therefore provides a national framework for achieving the Aichi Targets so as to conserve biodiversity and enhance the ecosystem services it provides to people.

1.2 CHALLENGES IN ACHIEVING THE AICHI BIODIVERSITY TARGETS

There are several implementation challenges that countries still need to overcome to achieve the Aichi Targets within the 10-year time frame:

First, there is a need for a paradigm shift from the contemporary conservation approaches, especially the traditional sectoral planning approach and management practices of environmental and natural resource agencies and organizations, to more integrated, ecosystem-based planning and coordinated management practices that address key concerns — biodiversity loss, unsustainable use, and increasing environmental pressures from human activities. This requires a higher level of programme integration and coordination among economic development and conservation/environmental management agencies manifested by strong policy direction. However, agency and political interest often hinder the process. Although the Conference of Parties to the CBD has adopted the ecosystem approach (decision V/6) to guide countries in developing and implementing national conservation programmes, the need for the involvement of relevant agencies and stakeholders at the ground level as well as the incentives for them to do so, remain as major impediments in achieving the Aichi Targets.

Second, while it is necessary to emphasize balance between economic development and biodiversity conservation, the absence of practical guidelines makes it difficult for coastal planners and practitioners to determine the level and rate of economic development to be allowed against the types and level of biodiversity loss and the level and intensity of conservation efforts that are needed, considering that there are many other issues, such as job generation, poverty eradication and GDP growth, that need to be addressed by economic managers. The lack of clear understanding on the part of the policymakers and economic planners of biodiversity values and ecosystem services has generally resulted in placing environmental and conservation issues at the bottom of most governments' priority agenda, not to mention failure to mainstream conservation initiatives into the national or local economic agenda.

Third, lack of funds is often the convenient excuse for not implementing biodiversity conservation programmes. Biodiversity conservation is usually not included as part of the agenda for economic growth as it is often considered a non-revenue generating sector. Even if it is included, the lack of an innovative sustainable financing mechanism for conservation

and environmental improvements place it low among the priorities of government programmes.

Fourth, methodology for integrated planning and management of marine and coastal areas is still in its nascent stages, with some 30 different approaches implemented in many different countries around the world and with varying emphases, such as coastal area management (CAM), community-based management (CBM), coastal resource management (CRM), ecosystem-based management (EBM), integrated coastal management (ICM), integrated coastal zone management (ICZM), integrated marine and coastal area management (IMCAM), and integrated coastal and ocean management (ICOM). Among these, EBM (Box 1.2), ICM and ICZM are the most common approaches and have been adopted in many countries. While almost all approaches are largely guided by the principles of sustainable development and have highlighted the importance of conflict resolution, stakeholder participation, and holistic and integrative planning and management, most, if not all, have yet to standardize their approaches and methodologies. The difficulty lies with the level of management complexities and the varying conditions at the local, national, regional and even global level.

Box 1.2 A Summary of the Concept and Operational Modality of Ecosystem-based Management (EBM)

Ecosystem-based Management (EBM) is a holistic approach to managing resources that considers the connectivity and complex interactions within and between human beings, the living environment and the non-living environment (Clarke and Jupiter, 2010). EBM aims to sustainably manage target and non-target species by preserving or restoring habitat quality to maintain ecosystem processes, functions and services.

The EBM approach adopts the following principles (Clarke and Jupiter, 2010): (1) integrated ecosystem management approach; (2) maintenance of the health, productivity and resiliency of ecosystems; (3) maintenance and restoration of ecosystem and socio-cultural systems connectivity; (4) incorporation of social, cultural and economic values into management planning and implementation; (5) participatory management planning process; (6) precautionary and adaptive management process; and (7) use and integration of relevant scientific, traditional and local knowledge.

The key steps in the EBM planning process are as follows (Clarke and Jupiter, 2010): (1) identify and involve stakeholders; (2) identify ecosystem values; (3) understand the management context; (4) identify key management institutions; (5) identify goals, targets and threats; (6) establish management strategies; (7) develop compliance mechanisms; (8) deliver education and outreach programmes; (9) identify monitoring and research priorities; and (10) establish review and adaptation process.

EBM has been widely implemented, and approaches differ across differing management contexts. In the marine and coastal zones, Clarke and Jupiter (2010) presented case studies of EBM in the tropical Western Pacific that differed significantly from EBM practices of temperate countries due to their differing social, political and ecological conditions. Also, Tallis, et al. (2009) presented two different scenarios where the EBM approach was used and has proven to be successful despite the difference in their circumstances, such as Raja Ampat, Indonesia (characterized by poor data and weak governance) and Puget Sound, Washington, USA (characterized by ample data and strong governance).

According to Tallis, et al. (2009), EBM is difficult to put into practice because of the following reasons: (1) perceived to be too complicated, (2) prohibitive information requirements and (3) scarcity of evidence of improvements.

The role of ecosystem-based approaches in marine ecosystems to achieve an Aichi Biodiversity Target is explicit in the description of ***Target 6***. The flexibility of implementing EBM in a varied management context, however, also makes it applicable for achieving several other Aichi targets, such as ***Targets 4, 5, 7-12, and 14***.

Finally, national and local capacity in integrated planning and management are grossly inadequate to lead coastal and marine planning, and execution of action plans. The challenge is largely due to lack of competent coastal or conservation managers with broad-based planning and management training, who can lead, mobilize and facilitate human and financial resources to steer inter-sector environmental planning as well as management interventions toward achieving a common vision. Specialized knowledge and technical skills relevant to coastal and marine management are equally inadequate, particularly at the local level.

1.3 APPLICATION OF AVAILABLE APPROACHES AND METHODOLOGIES

Over the last two decades, ecosystem-based management (EBM) and the ecosystem approach (EA) have been internationally recognized as the most appropriate approaches to achieve the Aichi Targets (Clarke and Jupiter, 2010; CBD 2004; Heather et al., 2010). Implementation of EA is guided by a set of 12 principles using ICM, ICZM and IMCAM as the effective tools for realizing the CBD goals, specifically those associated with the conservation and sustainable use of marine and coastal biodiversity (CBD, 2004). The general concept and principles of ICM, ICZM and IMCAM are largely similar although operational modality might vary somewhat in terms of emphasis, application, issues addressed, geographical coverage, as well as the local, national and regional conditions in which these tools are to be applied (Clark, 1996; Cicin-Sain and Knecht 1998; Chua, 2006).

Marine spatial planning (MSP) is another widely adopted planning approach in the allocation of marine space for human activities, including the setting up of marine protected areas (Box 1.3; Ehler and Douvere, 2009; Collie et al., 2013). MSP is a more refined planning process that considers the best utilization of marine space based on ecological and geographical conditions as well as the economic development objectives of the area concerned. MSP makes best use of the ecological function of the marine areas and should be used in a wider context of coastal and marine area management; thereafter, it should be incorporated into a broader planning and management framework such as ICM or IMCAM (Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel–GEF, 2012). Sea-use zoning or functional zoning of coastal and marine areas, which has been in practice throughout the coasts of China, for example, is another form of MSP. Over a decade of practice, sea-use zoning has been fully integrated into coastal development planning in all coastal provinces and municipalities in China (Chua, 2008; Chua, 2013).

Learning from past practices (Clark, 1996; Olsen, 2003; Chua, et al., 1999; Chua, et al., 2006; Shipman and Stojanovic, 2007), ICM has evolved over the years into a relatively mature planning and governance system underscored by the following: clearly defined policy and management frameworks; participatory planning and stakeholder consultation processes for developing strategies and action programmes; mechanisms for interagency coordination, scientific advice, stakeholder participation, stewardship and capacity development; and innovative approaches for mobilizing investment for environmental protection and biodiversity conservation. The government, especially at the local level, has to play a central role in the process so that appropriate legislative or administrative measures are developed, modified and implemented, and budgetary allocations are made available and mainstreaming into national and local economic agenda is facilitated. ICM working models using the local government as the main driver are now available in East Asia to demonstrate the replicability of the integrated approach.

There are a variety of specialized tools being used in the development of coastal and marine area management programmes. Examples of these include rapid appraisals (Pido, 1995; Pido and Chua, 1992), consensus building (Susskind et al., 1999),

environmental accounting (Hecht, 1999), information management systems (PEMSEA, 2005), risk assessment and risk management (MPP–EAS, 1999), and other tools and methodologies (Chapter 8 in Chua, 2006) from which support for ICM initiatives can be drawn to attain the strategic goals of the Strategic Plan.

Box 1.3 A Summary of the Concept and Operational Modality of Marine Spatial Planning

Marine spatial planning (MSP) is the public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that are usually specified through a political process (Ehler and Douvere, 2009). MSP is a framework for implementing an ecosystem-based management aimed to support and sustain present and future uses and delivery of valuable services of the marine ecosystem

Effective MSP is guided by the following principles (Ehler and Douvere, 2009): (1) ecosystem-based; (2) integrated across varied sectors and levels of government; (3) place-based; (4) adaptive; (5) strategic and long-term; and (6) participatory (stakeholders actively involved in the process).

MSP is developed and implemented through an iterative 10-step process, with many feedback loops, that involves (Ehler and Douvere, 2009): (1) identifying needs and establishing authority; (2) obtaining financial support; (3) organizing the process through pre-planning; (4) organizing stakeholder participation; (5) defining and analyzing existing conditions; (6) defining and analyzing future conditions; (7) preparing and approving the spatial management plan; (8) implementing and enforcing the spatial management plan; (9) monitoring and evaluating performance; (10) adapting the marine spatial management process.

Several European countries have already initiated the implementation of MSP; some of the more prominent examples are in the North Sea and Baltic Sea (http://www.unesco-ioc-marinesp.be/msp_around_the_world). MSP is also gaining momentum in the United States and Canada as well as in some Asian countries, such as China and the Philippines. The best example of implementing MSP, however, is in the Great Barrier Reef Marine Park in Australia, where the process was initiated 30 years ago (Douvere and Ehler, 2008).

There are several constraints to implementing MSP, especially where the area straddles multiple jurisdictions (SCDB and STAP-GEF, 2012). Constraints include: poor institutional engagement; lack of understanding for the planning process and multi-disciplinary approach; lack of technical capacity; lack of ecological data; lack of understanding of cumulative impacts of interventions on marine environment; essentially top-down nature of large-scale planning, which needs to be reconciled with bottom-up planning; conflicts between traditional and new economic activities; and the lack of comprehensive economic benefit-cost analysis in marine areas.

The MSP approach complements the objectives of the CBD Strategic Plan for Biodiversity 2011-2020 and is particularly applicable for achieving Aichi Biodiversity Target 11, which recommends the use of area-based conservation measures, as well as protected area systems integrated into the wider landscapes and seascapes to conserve areas of particular importance for biodiversity and ecosystem services. Implicitly, MSP, which has been viewed as a tool for realizing EBM (Douvere and Ehler, 2008), may also aid in achieving Aich Biodiversity Target 6, which states that ecosystem-based approaches should be applied to manage and harvest aquatic resources sustainably.

1.4 PURPOSE OF THIS GUIDANCE DOCUMENT

This guidance document[3] has been prepared for policymakers and environmental/conservation management practitioners for the application of ICM for achieving the Aichi Targets, especially in coastal and marine areas. The approach and methodology used in this document are largely based on the consolidation of working models developed by the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), an international organization implementing a regional sustainable development strategy for the seas of East Asia. Its experience in and methodologies for local, national, and regional coastal and ocean governance can prove instructive to the design of local, national and regional action programmes for achieving the main goals of the CBD Strategic Plan as well as for mainstreaming them into respective economic development agendas (PEMSEA, 2011a), Annex).

1.5 BRIEF INTRODUCTION OF SECTIONS

This guidance document consists of seven sections, in addition to the Executive Summary. Section 1 provides a general introduction to the CBD Strategic Plan for Biodiversity and its Aichi Biodiversity Targets, and challenges to their implementation. This section also briefly discusses available approaches and methodologies that could be applied to achieve the Aichi Targets, including marine spatial planning (MSP), ecosystem-based management (EBM), and integrated marine and coastal area management (IMCAM).

Section 2 introduces the concept of and methodologies for integrated coastal management (ICM). It discusses the complexities in the management of inland, coastal and marine areas, and challenges in achieving sustainable development. This section also discusses the ICM approach and experiences in implementing ICM in different areas, the issues addressed, and the evolution of the concept and management practices. The ICM system is the result of several decades of management improvements that apply the principles of the ecosystem approach, the process of integrated planning and management methodologies, the use of consensus building and the participatory approach, and the employment of ICM cyclical processes that enable modifications of policy and management practices. This section also provides a concise description of the components and dynamics of the ICM system, its application, performance monitoring, evaluation and reporting. Four case studies are briefly introduced, including Chonburi (Thailand), Sihanoukville (Cambodia), Batangas Provinces (Philippines) and Xiamen Municipality (China),

Section 3 outlines the contribution of ICM in achieving the vision and mission of the Strategic Plan for Biodiversity 2011-2020. It clarifies the vision and mission of the CBD and how ICM could make positive contributions as a possible operational tool for realizing the Aichi Biodiversity Targets.

Section 4 provides practical guidelines for addressing the Aichi Targets through ICM and its scaling-up. It justifies the application of ICM for achieving the targets by stressing the various advantages of the tested methodology, its coverage and its successful experience in the East Asian Seas region. This section attempts to integrate strategic goals A to E of the CBD Strategic Plan for Biodiversity into the ICM programme by first matching the targets with the essential components of the ICM system, and relating how each component element of the ICM system helps to address each of the five specific

3 Readers and users of this document should take note that the guidance provided herein is largely based on the working experiences and lessons learned from PEMSEA's two decades of operation in implementing ICM and regional marine strategies for sustainable development in the East Asian Seas region. Although the key biodiversity concerns have been included in PEMSEA's approach and the possibility of incorporating the Aichi Targets into future ICM programmes has been suggested, the proposed biodiversity-focused ICM programme has yet to be fully tested on the ground.

strategic goals and relevant targets. This section then provides guidance on strategic steps, including the initiation, development and implementation of biodiversity-focused ICM programmes for achieving Aichi Targets 1 to 13 based largely on PEMSEA's ICM experiences. This section closes with a description of functional and geographical scaling-up of ICM programmes throughout national coastlines.

Section 5 provides guidance on mainstreaming the Aichi Targets into local, national and regional implementation of coastal and marine management programmes through the creation of an enabling environment for unifying and scaling-up of biodiversity-focused ICM programmes, moving toward functional and geographical scaling-up to achieve the Aichi Targets.

Section 6 outlines major lessons learned from the implementation of ICM practices in the East Asian Seas Region, including building local acceptance and ownership to ensure sustainability, forging perception change to effect a paradigm shift in planning and management, building local capacity through "learning by doing", adopting precautionary principles in scientific uncertainties, creating an informed public to drive political will and making ICM visible to improve interagency cooperation. This section also highlights lessons from implementing the regional marine strategy, Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). This section ends with a list of possible implementation challenges in achieving the CBD Strategic Plan for Biodiversity and its Aichi Biodiversity Targets.

Section 7 presents the conclusions derived from justifying and demonstrating the practical application of ICM and the use of the SDS-SEA for achieving the 20 Aichi Targets. This section aims to support environment policy-makers and biodiversity practitioners in applying ICM in the context of national, sub-national and regional implementation of the CBD Strategic Plan for Biodiversity 2011–2020.

2. INTRODUCTION TO THE CONCEPT AND METHODOLOGY OF INTEGRATED COASTAL MANAGEMENT (ICM)

This section aims to introduce the concept of integration in terms of management policy and practices in achieving sustainable development at the local level, based primarily on PEMSEA's two decades of ICM efforts in several countries in the East Asian Seas region. The ICM methodology has improved over many years through several ICM initiatives under different socioeconomic and political conditions. Introduced in this section is a standard methodology that is now used in new ICM initiatives in the East Asian Seas region, as promoted by PEMSEA.

2.1 GOVERNANCE AND MANAGEMENT COMPLEXITIES IN MARINE AND COASTAL AREAS

Physical, ecological and socioeconomic characteristics of the coasts

Coastal areas refer to that part of the coastal sea and the adjacent terrestrial land impacted by both the marine and the terrestrial environment (Figure 2.1). The coastal area under national jurisdiction stretches inward to the watershed and seaward to the edge of the territorial sea, which is normally 12 nautical miles from the coastline. A network of river systems connects the land and the sea. Thus, the coastal area is rich with diverse ecosystems and prolific coastal and oceanic species, many of which are of commercial importance and have traditionally provided the coastal inhabitants with their main source of animal protein and livelihood.

The coastal land area covers approximately 10 per cent of the earth's land surface but is disproportionately inhabited at present by more than 50 per cent of the world population. It is expected that more than 75 per cent of the world's population will be residing in this narrow strip of coastal lowland by the year 2020. The coastal area has, thus, become the centre of a wide array of diverse economic activities, including trade, commerce, services, manufacturing and primary production. In fact, in most coastal

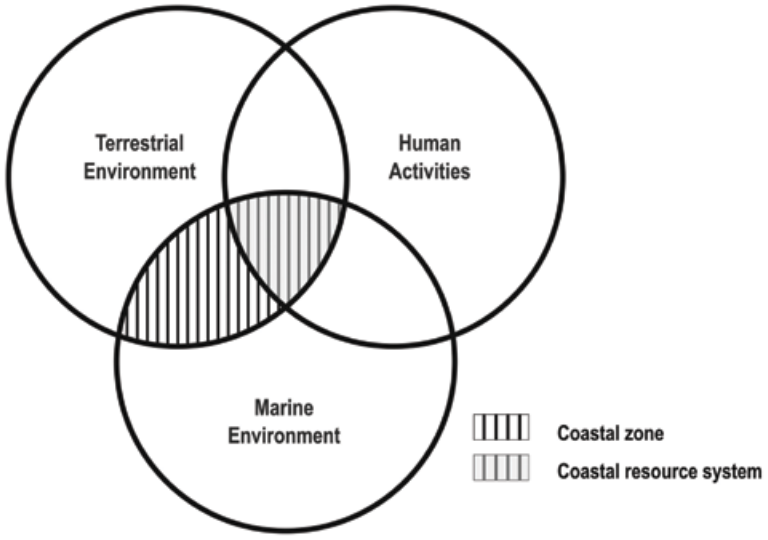


Figure 2.1. The coastal zone and the coastal resource system (Scura et al. 1992).

nations, the coastal area is the locus of human activities; thus, it plays a very important role in national GDP growth. With the concentration of economic development in urban towns and cities, and a corresponding improvement of lives in these areas, coastal urbanization has been progressing rapidly in the last two decades.

Governance and management complexities

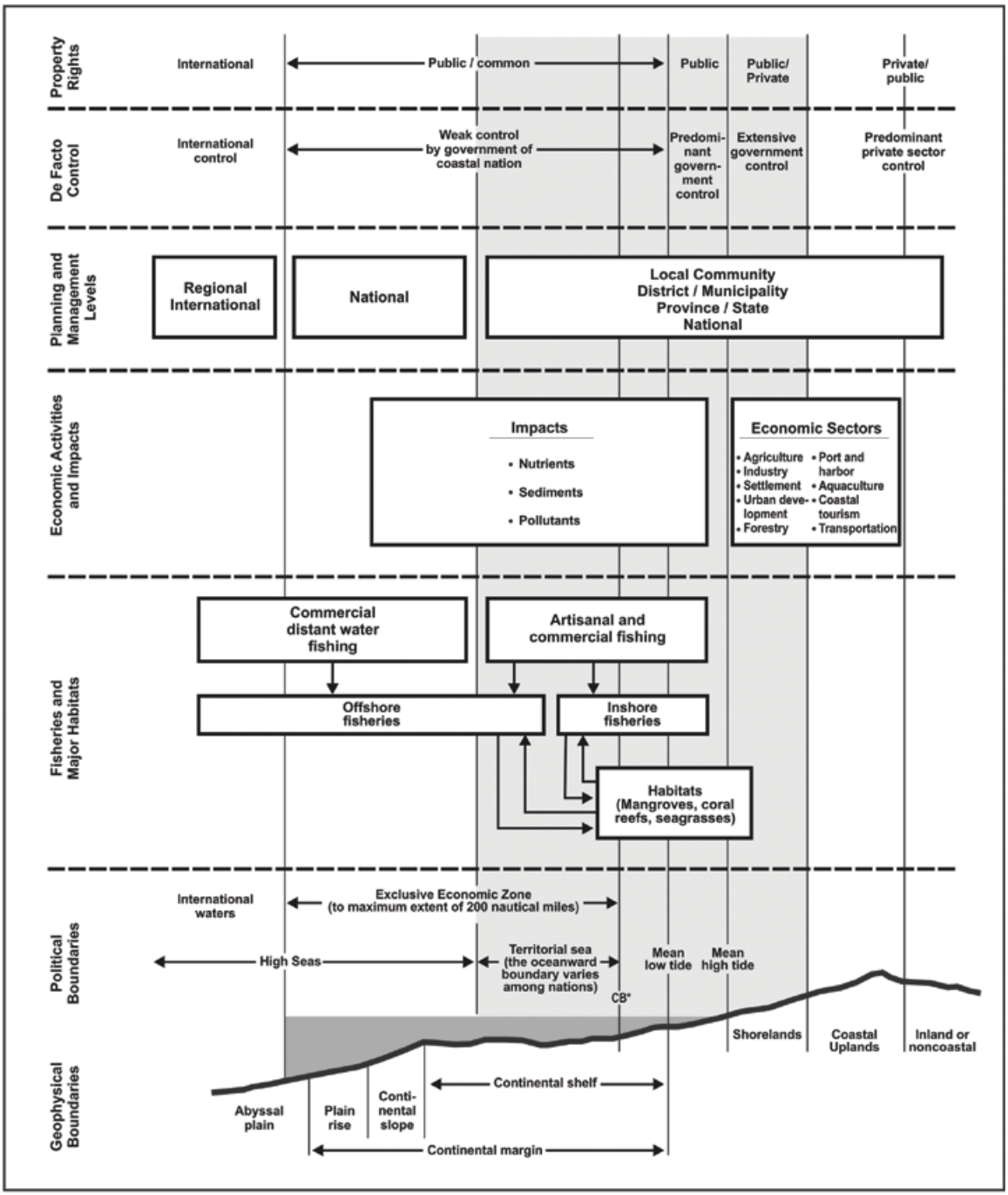
Although the rapid rate of economic development and coastal urbanization has contributed to an improved standard of living for the coastal populace, it has also amplified the pressure on the natural resources, thereby severely damaging the environment (particularly causing pollution, biodiversity loss, sea-level rise, freshwater shortage and increased water temperature), widening social inequity (specifically income gaps between rich and poor, and between rural and urban areas, as well as the exodus of young people from rural areas) and threatening the sustainability of economic practices (especially the production and manufacturing industries). Nature has provided humankind valuable goods and services through diverse ecosystems, but prevalent anthropogenic practices have placed the health of the environment and its capacity to provide for human needs at a considerable risk.

Coastal management is further complicated by the property rights regimes that operate on both sides of the coastal area, where the ocean-side is distinguished by a public character while a mix of public and private characters operates in the landward area (Cicin-Sain and Knecht, 1998) (Figure 2.2). As most of the human population and economic activities are located in the coastal lowland, sustainable management of the coastal area has become extremely challenging, especially in areas with diversified private property rights. On the seaward side, moreover, management of the public regime is complicated by international boundary issues, resource claims and intensity of marine economic development (Tropical Coasts, 2009). As such, coastal management becomes more difficult and complicated with increased geographical scale.

The challenge to coastal planners and managers is to plan and manage the diverse, complex and complicated environmental issues and the associated human behavioural problems, particularly (1) how to ensure sustainable economic development in the coastal and marine areas, (2) how to protect the functionality of the ecosystems, (3) how to repair and restore degraded habitats, (4) how to stop or reduce the adverse impact of pollution on human and ecosystem health, (5) how to ensure a continued supply of clean freshwater and good air quality to the coastal inhabitants, and (6) how to mitigate the impacts of disasters that affect lives, properties and economies in coastal areas.

2.2 MARINE AND COASTAL MANAGEMENT APPROACHES

There are several management approaches that have been applied in the past four or five decades addressing some of the aforementioned challenges. They can be grouped primarily into the following: (1) traditional or indigenous practices that use coastal lowlands for settlement and the living resources for subsistence or household use, such as for food, fire and medicines; (2) resource- or sector-focused (including freshwater) management practices such as coastal resources management (CRM), water resource management (WRM), and fisheries resource management (FRM); (3) conservation-focused management practices, such as ecosystem management (EM), ecosystem-based management (EBM), ecosystem-based adaptation (EBA), and marine protected areas (MPA); (4) area-based management practices such as coastal zone management (CZM) and coastal area management (CAM); (5) community-focused management practices such as community-based management (CBM), and (6) integration-focused management practices such as integrated coastal management (ICM), integrated coastal area management (ICAM), integrated water resource management (IWRM), integrated marine and coastal area management (IMCAM) and integrated coastal and ocean management (ICOM).



CB* - The coastal baseline is a series of lines that interconnect coastal headlands and promontories; it is the reference point used to map the oceanward boundary of both the territorial sea and the exclusive economic zone.

Figure 2.2. Schematic diagram showing overlapping biophysical, economic, institutional and organizational boundaries in coastal areas (modified from Scura et al. 1992).

The multiplicity of coastal management approaches has inevitably caused considerable confusion among planners, managers, and those interested in sustainable coastal and ocean management. During the last four decades, the various management approaches/tools mentioned above have been introduced and applied in many developing countries, especially in the Asian region, mainly through foreign donors-assisted projects. At the same time, coastal management practices in the marine and coastal areas have gradually evolved over the last several decades in the following manner:

- From simple, traditional or indigenous community-based management practices to issue- or sector-specific or natural resource-based management practices;
- From single-issue or single-sector management practices to multiple-issue, cross-sector management practices; and
- From loosely organized coastal management practices to more systematic, legallybased integrated management practices.

Root causes of continued environmental degradation, biodiversity loss and diminishing ecosystem services

Despite several decades of national and international efforts to stop or reduce the threats of environmental degradation and unsustainable use of biodiversity resources, most countries, both developed and developing, continue to suffer from varying degrees of biodiversity loss, environmental degradation and declining ecosystem services; however, some coastal areas with sustained integrated management efforts have shown signs of environmental improvements. The root causes of the detrimental impacts could be traced to one or more of the following:

- ***Policy and market failures*** continue to weaken the foundation for sustainable development. Outdated management policies are unable to provide the needed policy support for social, economic and environmental sustainability. Some obsolete subsidy policies, such as those for fishing fleets and agricultural fertilizers, have proven to be counterproductive; not only do they disrupt normal market functions, but they are also unable to provide long-term benefits to the fisherfolk and farmers, respectively. For example, subsidies for fishing fleets have often resulted in over-capitalization in the fishing industry, which inexorably led to the rapid decline of fish stocks in coastal waters. Agriculture subsidies for fertilizers, meanwhile, have resulted in massive use of chemicals for increasing crop production without considering the negative environmental impacts downstream (Forsberg, 1998). Anoxia, red tides and harmful algal blooms are some of the destructive environmental consequences and require costly management responses (Diaz and Rossenberg, 2008; Raboukle et al., 2008).

On the other hand, lack of or insufficient policy support to provide economic incentives for environmental improvements, including pollution abatements, habitat restoration, and establishment of nature reserves and marine protected areas has diminished the level and halted the rate of environmental protection and improvements, and has consequently stymied the development of a green economy. Ineffective integration of sector policies and agency functions has often resulted in interagency conflicts that slow down environmental and conservation efforts.

The absence of recognition or incentives for local leaders (such as promotion or financial recompense) can be a practical reason for the low policy priority accorded to environmental protection in many local government development agendas. For example, large stretches of coastal land in the region have been reclaimed for mega- economic development projects, including the establishment of new townships. These newly developed coastal townships have generated employment, created business opportunities and contributed to national and local economic growth. Of course, the ability to contribute to GDP growth generates promotional incentives to responsible local officials. However, such forms of rapid economic development have resulted in severe and often irreparable environmental consequences, such as change of coastline, loss of habitats, impairment of ecosystem functions and eventual loss of environmental services. In some cases, new townships have emerged in the vicinity of abandoned or neglected old towns. Local leaders preferred development of new township over rebuilding of old ones not only because of the higher cost of the latter (wherein it would be difficult to raise the needed funds) but also to avoid encountering property rights issues and social difficulties (e.g., removal, compensation and legal complications). It is obvious that local leaders would choose to compromise environmental integrity for so-called economic development.

- ***Inadequate and inefficient institutional arrangements*** in terms of appropriate legislation, enforcement and interagency coordination could slow down the process for sustainable development of coastal areas. The prevalent deficiency in pertinent legislation to strengthen coastal governance and integrated management has hindered management efforts to meet the necessary changes arising from rapid economic development in coastal areas. Poor records of law enforcement of existing environmental legislation further undermine management actions. With increasing coastal management complexity, the absence of an effective interagency coordinating mechanism makes it doubly exigent to reduce interagency conflicts and to harmonize interagency collaboration.

  The absence or slow pace of decentralization of the necessary jurisdictional power to local governments could also hinder the implementation of environmental management measures at the ground level. In some countries, for example, managing marine fisheries or the marine environment is the full responsibility of corresponding central agencies.

- ***Insufficient financing to support environmental protection or for environmental improvements*** continue to be the main reason for lack of or insufficient government actions. This is partly due not only to the lack of innovative environmental investment approaches, but mainly because of the conventional reliance on government budgetary allocation. Efforts are needed to explore new opportunities for soliciting environmental financing, sourcing market incentives for green economy and effective use of private corporations through public-private sector partnership. This will require a change or modification of policy direction on the part of the local and national governments, as well as perception change on the part of their officials.

- ***Lack of individual and institutional capacity at local and national levels*** to plan and manage coastal and marine resources in a sustainable manner continues to deter the implementation of integrated coastal and marine management initiatives around the world. The problem of inadequate local skills to plan and sustainably manage coastal and marine areas needs to be resolved before any significant progress in sustainable coastal and marine area development could be expected. Likewise, the institutional capacity of concerned local agencies in coastal governance also needs to be upgraded for them to work and cooperate effectively in implementing common coastal management programmes.

- ***Insufficient public support and buy-ins from stakeholders*** continue to be the impediment for scaling-up sustainable coastal development programmes. Efforts to improve public awareness of sustainable coastal development, especially regarding biodiversity conservation, need to be intensified to create an informed public that has already internalized environmental conservation as a means to achieve a better economic future, thus creating the necessary public support or pressure for change. Stakeholders' buy-in of environmental improvement projects or sustainable development programmes at the local level need to be ensured and strengthened to reduce influence from political and sectoral interests.

- ***Insufficient use of scientific support and advice in decision-making*** continue to occur partly because of the lack of access to scientific advice and partly because of the scientists' difficulty to provide firm scientific opinions on some environmental issues due to knowledge gaps and scientific uncertainties. This has resulted in the inability of decision-makers to rely wholly on science to support their management decisions. While environmental impact assessment (EIA) has become a common requirement for the approval of new development projects, there are doubts over the quality and even credibility of many EIA reports and the effectiveness of this measure, especially with respect to compliance.

ICM practitioners need to pay attention to the aforementioned causes of environmental problems and should heed that concerted efforts are needed to address them in the development and implementation of ICM programmes as the conditions in each level of local government and locality might differ.

2.3 THE ICM APPROACH AND PRACTICES

Issues covered

ICM addresses the key issues relating to economic development, environmental governance and management of human behaviour. These issues are of strategic significance as they relate to the socio-economic well-being of the coastal areas, sustainability of ecosystem services and effectiveness of policy and management interventions. The following are the key issues that need to be considered collectively:

- ***Development issues affecting social, economic and environmental sustainability***
  Economic development on land and sea is the primary cause of biodiversity loss, environmental quality degradation, and loss of ecosystem services. On the other hand, economic development is indispensable, considering that half of the world population resides in coastal areas and that the people living there need to sustain their health and livelihood and improve their standard of living. As such, ICM efforts are directed toward preventing or minimizing the negative environmental and social impacts of economic development by incorporating environmental and biodiversity conservation concerns into the government economic agenda so that development issues are being considered in a more balanced manner. This is done through integrated coastal planning, such as land- and sea-use planning as well as marine spatial planning. The conventional policy of "development first and environmental protection later", though still being practiced in many countries of the world, is certainly no longer a wise choice as ecosystem restoration will certainly cost more, especially when the loss of certain ecosystem services might not be recoverable.

- ***Coastal governance issues requiring regulation of human behaviours affecting environmental sustainability***
  This is a challenging policy issue requiring a host of financial, legislative and administrative measures aimed at effectively regulating and managing human activities on land and at sea. A major focus in ICM is to develop the appropriate policy to guide sustainable coastal development through legislation and ordinances to control human activities such as fishing, sand mining, land reclamation, habitat conversion, discharge of wastes from land and sea and other activities that are potentially harmful to human and ecosystem health. ICM instigates the development and implementation of comprehensive coastal and marine strategies and results-oriented action plans to address key environmental management issues. It sets up institutional arrangements to promote interagency cooperation and collaboration and implement communication plans to increase public awareness for gaining stakeholder support. At the same time, ICM prepares the local government to develop human and financial capacity for long-term implementation of ICM programmes through the processes of the ICM cycle.

- ***Coastal and marine environmental issues that affect human and ecosystem health***
  Environmental threats have increasingly endangered the lives, health and properties of people living in coastal areas. Some of these threats may either be of sporadic or frequent occurrence, challenging human response capability and resilience to deal with the impacts. ICM addresses issues arising from both natural and human-induced disasters, pollution from land and seas, destruction of natural habitats, such as mangroves, watersheds and coral reefs, and overexploitation of natural resources leading to loss of livelihoods, biodiversity and ecosystem services. ICM develops and implements long-term strategies and action plans to address specific environmental concerns. Environmental management issues are usually complicated, and their resolution requires time, money, scientific advice and human resources.

- ***Financial issues relating to mobilization of financial resources***
  Environmental governance and management both require substantive financial support for implementing the Strategic Plan for Biodiversity 2011-2020 especially those activities requiring considerable investments for environmental

improvement infrastructures (e.g., habitat restoration, sewage treatment facilities, landfills for solid wastes, incineration facilities for toxic wastes, freshwater supply treatment facilities), facilities for disaster response, and climate change mitigation. Governmental budgetary allocation is no longer able to cope with the large investment needed. However, turning environmental improvements into business ventures in a green economy will make it possible to tap into the huge financial resources and expertise of the private sector.

- ***Information issues relating to use, storage, processing, dissemination, communication, management and data generation***

  Inability to utilize fully the power of communication often results in poor public awareness, mistrust among stakeholders, weak interagency coordination and ineffectiveness in plan implementation. The basic element of communication is information. A good communicator is one who can effectively use information through various communication tools to present a convincing story for a specific purpose. In the case of ICM, information plays a very important role in identifying issues, determining priority, building consensus, developing legislation, setting goals and objectives, influencing decisionmaking, and forming the database for policy, strategies and management action programmes. ICM effectively utilizes information, transforms and packages them into visible products, and disseminates them through its communication plans to reach out to the public and the relevant stakeholders.

  A common challenge in coastal management is that a large database/information- sharing mechanism is needed, which cuts across different sectors and disciplines. A great deal of primary data has already been gathered by various line agencies or research institutions for their specific use. Such databases are normally not available to other users and are difficult to obtain. The purpose of ICM is to secure these databases from concerned line agencies and institutions through the processes of the ICM cycle. This information is further analyzed to identify data gaps, consolidate past findings and discern initial environmental management issues. The processed information is then presented to the stakeholders and the public in general in the form of a coastal profile. ICM uses this information as the basis for undertaking other information-gathering activities in the development of the first generation of strategies and action programmes.

  Data-gathering requires a variety of expertise and specialized skills, and the exercise will need to source from other agencies and research institutions. The challenge is how to utilize the expertise and skills to formulate management policy and programmes that can be implemented successfully on the ground.

Development of ICM concept and practices

Over the last two decades, ICM has been widely adopted, tested and implemented in many different countries. Realizing the cultural, political, ecological and socioeconomic interconnectivity in a given area, ICM practices follow a systematic approach in the planning of coastal and marine uses as well as in the integration and coordination of action programmes for addressing prioritized environmental management and other concerns related to sustainable coastal development. Hence, ICM has evolved into a coastal management system with standardized methodologies that can be adopted for addressing similar sustainable development concerns in other coastal and marine areas. Building upon the concept, principles and practices of other coastal management approaches and tools, the ICM system has greatly enriched its operational procedures so it can be more cost-effective in achieving its goals and objectives.

Based on the development of coastal management concepts and practices, ICM can be broadly defined as a coastal management system that integrates, coordinates and implements strategic action programmes for regulating human behaviours in the use of coastal and marine resources and preservation of the functional integrity of terrestrial and marine ecosystems within a defined geographical or ecosystem boundary for the purpose of reducing environmental degradation, preserving biodiversity, ensuring sustainable supply and use of ecosystem goods and services and

harmonizing economic development activities so as to achieve the goals of sustainable development.

ICM is generally operated within the jurisdiction of the local government. As the national policy and legislation governing the functionality of local governments vary from country to country, the capacity of local governments to develop and execute ICM programmes might be restricted, especially with regard to the power to legislate or to allocate a budget and human resources. However, local governments who are concerned with sustainable development challenges can still implement the ICM programme especially because of local-level dynamics (Christie, et al., 2009). In fact, they could be equally, if not more, efficient and effective through innovative financing and partnerships with the private sector and other non-governmental stakeholders. In recent years, there has been an increase in the number of countries throughout the globe that have devolved the responsibilities for environmental management and sustainable development to their local authorities. In 2012, the UN Secretary General in reference to the outcome document of the Rio +20 Conference, "*The Future We Want*", made special reference to the vital role of local government in achieving sustainable development. His famous quote "Global is local and local is global" should guide the working philosophy of local governments around the world.

2.4 THE ICM SYSTEM

Chua (2008) outlines six essential components of the ICM system. The operation of the system is guided by the general principles of sustainable development but the actual operation at coastal sites in terms of priorities, effectiveness, issue coverage and management boundary will depend largely on the human resources, political commitment, financial capacity, availability of scientific advice and stakeholders' cooperation and support. Together with the interlinked ICM components, this constitutes the Sustainable Coastal Development Framework (SCDF) (Figure 2.3), which guides the processes in the development, implementation and performance review of ICM programme (Chua, 2008). These six essential ICM components are described as follows:

Governance

Within the jurisdictional capacity of the local government, the governance component covers the following: (a) policy reforms to harmonize sector policy and legislation/ordinances, review policy barriers to sustainable development such as outdated controversial subsidies, as well as institute policy to mainstream biodiversity conservation and environmental protection into government economic agenda; (b) review of existing outdated legislation and ordinances or their inadequacies so these can be replaced with new and relevant legislation and ordinances; (c) review of the adequacy and relevance of existing institutional arrangements and where needed, undertaking reform of existing institutions and their functions ; (d) development of strategic action programmes in line with the ICM goals and objectives; (e) development of an information management system which includes databases from other concerned agencies and research institutions for coastal management; (f) development of innovative sustainable financing mechanism to support environmental improvement projects as well as financial incentives for biodiversity conservation such as the development of nature reserves and marine protected areas; and (g) human capacity development to raise the capacity to plan and manage the coastal and marine areas. Through the effective use of the key elements of governance, i.e., policy, capacity, financing, information, legislation, and institutional arrangements, ICM practitioners can thus provide a governing framework within which coastal and marine areas could be planned and managed in a holistic and sustainable manner.

The ICM cycle

The most dynamic component of the ICM system is the sequential key stages in preparing, initiating, developing, adopting and implementing an ICM programme as well as the major steps in monitoring, accessing and reporting of outputs and outcomes. When the ICM programme has been successfully

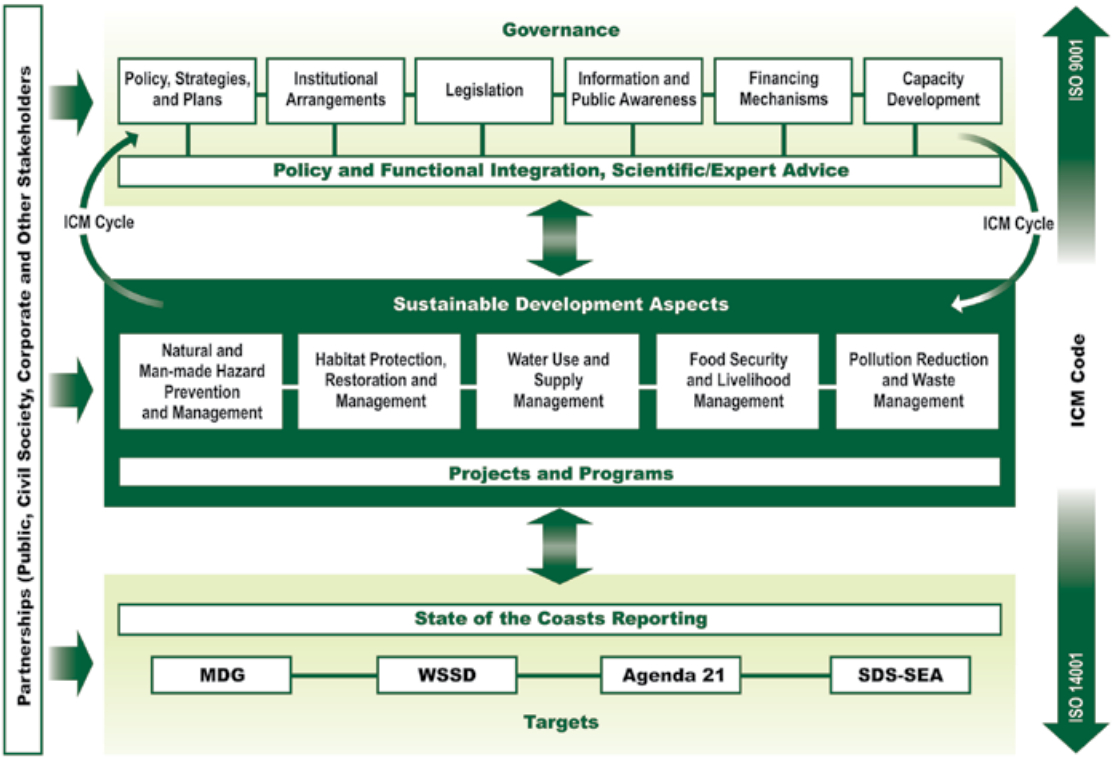


Figure 2.3. Sustainable Coastal Development Framework (PEMSEA, 2007).

developed and implemented, the final stage is to apply for international certification to ensure compliance with international standards of practice. These stages follow a cyclical process known as the ICM cycle (Figure 2.4). Indeed, the ICM cycle is an expansion of the ICM policy cycle proposed by GESAMP (1996).

Stage 1. Preparing

This first stage is the preparation, when the following are achieved: (a) establishment of an ICM project mechanism; (b) confirmation of management boundary to be covered by the ICM initiative (local government operates within a clear jurisdictional boundary, such as a coastal district, municipality, city or province); (c) confirmation of local government commitments to undertake the ICM project; (d) identification of core budget for project office operation; (e) assessment of the level of support and resistance from government agencies and stakeholders, including indigenous peoples and local communities; (f) assessment of the availability of human resources and local institutions with management and technical skills; (g) establishment of stakeholders' consultation mechanism; (h) training of core staff; and (i) establishment of monitoring and assessment protocol. The preparatory stage helps to identify political opportunity and available local champions essential to secure agency support, public acceptance and government commitment, as well as to create the necessary enabling environments for ICM execution. This is the critical stage in the whole ICM cycle, and due effort and time should be allocated for it.

Stage 2. Initiating

This stage aims to lay down the strategies for management actions to be applied through the ensuing process. It includes the following: (a) undertaking the preparation of a scoping document detailing the cultural, ecological, political and socio-economic characteristics of the target area, normally presented in the form of a coastal profile; (b) identifying issues affecting sustainable coastal

Figure 2.4. The ICM cycle (PEMSEA, 2011).

and marine development; (c) commencing analysis of initial risks and prioritizing them; (d) finalizing the scoping document for the preparation of a long-term coastal strategy and strategic action programmes. (Note: such a scoping document could be published in the form of a coastal profile or a "state of the coast" report, as described by PEMSEA (PEMSEA, 2011)); (e) setting up an integrated information management system (IIMS) to gather, store and utilize data for future use; and (f) preparing the ground work for stakeholder consensus building as well as continuing with the efforts of building local capacity.

Stage 3. Developing

This is the most tedious and complicated stage of the ICM programme preparation, and it is aimed at achieving the following: (a) a functional inter-agency coordinating committee directly under the local administration; (b) completion of a refined risk assessment, including ecosystem and human health risks; (c) development of a common vision and mission of the ICM programme; (d) formulation of a comprehensive, time-bound coastal strategy implementation plan (CSIP), including coastal zoning or marine spatial zoning, monitoring, implementation and information management of the communication plans; (e) initiation of primary data gathering for subsequent analysis of the effectiveness of coastal governance and management measures; and (f) the development of a sustainable financing mechanism to launch and operate ICM-related programmes.

Stage 4. Adopting

The next stage is as critical as the above two as it prepares for the adoption of the ICM programme and its implementation. The key efforts at this stage are to convince the major stakeholders of the potential benefits from the implementation of the ICM programme and to persuade relevant government agencies of the benefits they could share by pooling human and financial resources. Considerable efforts are needed to convince concerned line agencies that ICM is neither intended for taking over the roles of individual agencies, nor for partaking of their standing budgetary allocations; rather, it is meant

for enhancing each agency's role and responsibility toward a collective gain. Securing the acceptance of stakeholders and concerned agencies increases the chance that the ICM programme will be approved by the local government. Major outputs include the following: (a) approval of the CSIP, including budget; (b) new policy or legislative instrument, if any; and (c) identification of new funding sources.

Stage 5. Implementing

This stage of the ICM programme requires the following key elements: (a) strong coordination to ensure cost effectiveness in programme implementation; (b) application of technical and management skills to implement various time-bound action plans in meeting specific goals and targets; (c) buy-ins from concerned line agencies and stakeholders from the private sector and other civil society groups, including indigenous peoples and local communities; (d) strong communication to keep the public informed of progress; and (e) strong leadership with interpersonal skills to moderate, negotiate and facilitate the implementation of various activities over and above the ability to apply adaptive management. The coverage of action plans may vary from site to site depending on priority, capacity and time frame.

Stage 6. Monitoring, evaluating and reporting

This stage of the ICM programme consists of three sequential sub-stages: monitoring, evaluating and reporting. These sequential sub-stages, moreover, are continuous activities throughout the process of ICM development and implementation. This stage is aimed at ensuring the ICM process is faithfully followed; outputs and outcomes are to be evaluated and reported in a form that could be easily visualized and understood by the policymakers and the general public. The reporting produced in this stage can then be periodically updated after the completion of each ICM cycle.

Sustainable development aspects

ICM addresses key environmental and conservation concerns and the factors affecting them. Environmental quality degradation and biodiversity loss are two major barriers to sustainable coastal and marine development. These concerns are common in almost all coastal and marine areas around the world and especially serious in developing nations, as they affect the lives, livelihood, properties and living conditions of a large number of people living in the coastal area; a majority of them are marginalized and underprivileged. This component of ICM addresses the following five key sustainable development challenges:

a) Habitat Protection, Management and Restoration

Human economic activities have severely damaged or destroyed many coastal and marine habitats (such as mudflats, mangroves, salt marshes, seagrass beds and coral reefs) through coastal reclamation, conversion and unsustainable harvesting, resulting in the loss of biodiversity, depletion of biological resources, local extinction of endangered species, decimation of nursery and spawning grounds of aquatic animals and eventual loss or reduction of ecosystem services provided by these habitats. The ICM processes help to identify the types and scale of habitats that need to be protected and managed, as well as those requiring rehabilitation and restoration. Setting up marine reserves and marine protected areas are some of the more common measures implemented. Rehabilitation and restoration is much more difficult to execute, but it has to be done, nevertheless, to repair the damaged habitats through replanting or other physical or natural means.

b) Water Use and Supply Management

Freshwater is an important and indispensable resource not only needed to meet the daily consumption of the continually expanding coastal population but also to sustain the watersheds, riverine ecosystems and estuarine ecosystems at river mouths. The brackish water environment ensures rich primary productivity, supports diverse species of plants and animals, and maintains a rich fishery resource. The ICM processes help to identify the level of freshwater resources, supply, and use with the purpose of ensuring not only a continuous supply of freshwater to the coastal population but also to manage freshwater resources to ensure that they are sufficient to meet both human and ecosystem needs. Reduction of waste, protection of watersheds and prevention

of water quality degradation are important steps taken through ICM.

c) Food Security and Livelihood Management

Food security is a growing concern among coastal populations because of the persistent decline of fishery resources as well as the increasing contamination of fishery and marine products. Most coastal waters are heavily overfished, and sustaining an affordable fishery supply has become a challenge. This will affect animal protein supply, as a majority of the coastal population especially the rural poor, depends primarily on fish as the main source of animal protein. Fishing is a major source of rural livelihood which, in turn, is severely affected by the rapid decline of fishery resources. ICM processes help to explore alternative livelihoods, protect or rehabilitate nursery and spawning grounds, determine the types and level of food security issues and identify the root causes and proposed management measures to halt or reduce fishing intensity.

d) Pollution Reduction and Waste Management

Pollution poses a major challenge to coastal management because most coastal areas are heavily populated, and some are highly urbanized with diverse economic activities. Not all domestic and industrial wastes are adequately treated, while large amounts of contaminated freshwater enter the coastal seas through riverine and land discharges. Many nearshore waters, estuaries and rivers suffer from organic pollution from sewage, giving rise to hypoxia, harmful algal blooms, red and green tides, and even dead zones. Industrial wastes are normally treated, however a substantial amount still enters the waterway, contaminating fish and fishery products and causing harm to consumers. Solid waste is another severe problem as inadequate collection and improper disposal not only block waterways, causing public health concerns, but much enters coastal waters as marine debris, posing problems for fishing, marine transportation and change of sea bottom configuration. The ICM processes place considerable efforts on identifying the type, quantity and source of wastes, their route into the marine environment, as well as determining their impacts and developing different management interventions.

e) Prevention and Management of Natural and Human-induced Hazards

Natural hazards, such as tsunamis, floods, typhoons, earthquakes and storm surges, have devastating impacts on lives and properties when they strike coastal areas. The negative impacts on the coastal and marine economy can be very high, depending on the extent, magnitude and severity of the natural hazards and disasters caused. With the increasing adverse impacts of climate change, natural hazards recur more often than usual and with escalating intensity. Rising temperature and ocean acidification increasingly threaten the fragile coral ecosystems, resulting in loss of ecosystem services (Eakin et al., 2008). In addition, hazards or disasters caused by human activities, such as oil and chemical spills and discharge of nuclear wastes, have severe economic and health consequences. The discharge of ballast waters from ships has transported thousands of invasive alien species to seas and oceans around the world. The introduction and proliferation of invasive alien species have been one of the leading causes of biodiversity loss as many of them prey on native species. This may have serious long-term implications for food security, human health and economic consequences.

Stakeholder participation

The participatory approach is essential to ensure that the ICM programme developed has the endorsement of the stakeholders in achieving a common vision. ICM processes help to ensure that regular consultations with stakeholders are conducted throughout the ICM programme development and implementation. Stakeholders can be a formidable driving force in influencing government policy, promoting government commitments and contributing to co-financing of environmental improvement projects.

Monitoring, evaluation and reporting

Performance indicators are developed to measure the process, results and impacts. One example of a means to report these indicators is through the "state of the coasts" reporting format utilized by PEMSEA, which provides a list of performance indicators that can be used while monitoring programme

development and implementation, as well as assessing the outputs and outcomes (PEMSEA, 2011).

ICM certification

ICM certification is not a compulsory stage for an ICM programme but is a useful add-on practice to ensure that the ICM approach and programme implementation are in compliance with international standards on governance (ISO 9001) and environmental management (ISO 14001). At PEMSEA, ICM certification is still in its initial stage of development (Chua, 2006).

2.5 ICM METHODOLOGIES

The general approach is to apply the sustainable coastal development framework (SCDF) to develop and implement an ICM programme based on local conditions. An assortment of specific tools is being applied to undertake analysis, generate information, and develop policies, legislation and strategic action plans. Skilful application of the key driving forces (or dynamics) of ICM will improve the effectiveness and maturation of an ICM programme. Many of the details, including various technical and management tools, are given by Chua (2006). The key steps in developing an ICM programme are presented below.

Developing an ICM programme

Step 1. Identify goals, objectives and essential actions necessary for the intended programme.
The goals, targets and specific objectives may vary with different locations and issues, as may the actions to achieve them. The following are essential and strategic actions unique to all ICM programmes:

a) **Set up a governance framework**
All ICM programmes require a governance framework, the implementation of which regulates human behaviour, increases cost-effectiveness in addressing the complexities of coastal management, and responds to the values and concerns of the stakeholders;

b) **Create a shared or common vision of stakeholders**
to set the initial objective of an ICM programme and to drive plans, actions, policies and strategies;

c) **Identify and prioritize key sustainable development challenges**
to enable a systematic and incremental approach in resolving environmental and other sustainable development challenges according to risk priorities, financial, and human resource capability;

d) **Set policy and management directions**
to address priority issues and meet specific targets and objectives, allocate human resources and budget, and delivery time frame for specific outputs;

e) **Set up a coordinating mechanism**
to promote interagency and stakeholder collaboration and partnerships, and to strengthen the mechanisms for effective use of the common vision, public support, transparent process and consensus-building;

f) **Enable policy and functional integration and mainstream sectoral activities**
to reduce or minimize policy and interagency conflicts and increase cost-effectiveness in plan implementation;

g) **Enable local stakeholders to plan and manage their own natural resources**
to ensure stakeholder ownership and environmental stewardship, which will contribute to achieving set objectives;

h) **Integrate scientific support in policy and management decision-making**
to ensure science-based coastal management programmes, reduce political or sectoral interest in decision-making, and increase management effectiveness and efficiency;

i) **Build partnerships in environmental management and investment**
to increase and mobilize the technical and financial resources of stakeholders for environmental

management and to secure cooperation between the public and private sectors in environmental improvement projects;

j) **Create functional communication networks among stakeholders**
to build a well-informed public whose support is instrumental to ICM successes; and

k) **Monitor, evaluate, and report management efforts and their impacts**
to ensure effectiveness of policy and management measures in meeting objectives and targets.

Step 2. Confirm the site

Before committing human and financial resources for the development of an ICM programme, a rapid appraisal of the proposed site is carried out to identify its manageability in terms of geographical coverage and the nature and severity of environmental concerns requiring policy and management interventions. An ICM initiator should be aware of the challenges that will be confronted, especially with regard to the types and level of resistance or support from concerned stakeholders. Equally important is to be aware of the key obstacles arising from political or sectoral interest groups and to identify local champions who could help in the initiation of ICM programme development. A commitment from the local government concerned is a prerequisite as any achievement of an ICM programme requires political and financial investments to support policy reform and management interventions. The rapid appraisal will also contribute to the final decision on the boundary of the management area. The outcome of such rapid appraisal is the announcement by the government of its decision to develop an ICM programme in the designated management area.

Step 3. Set up project-operating mechanism

An ICM project office should be established and, where possible, placed directly under the supervision of the local government to ensure smooth coordination. It should have a small group of core staff with defined roles and responsibilities. The project office needs to work with all concerned government agencies and stakeholder groups to jointly develop the ICM programme. As such, a coordinating committee should also be established with representation from relevant line agencies, NGOs, academe, scientific communities and concerned business sectors. The head of the local government or his/her representative should chair the committee. The coordinating committee should also have clearly defined policies and management functions, especially in providing policy direction and support to the project office in coordinating the development and implementation of the ICM programme. Also to be established is a technical advisory committee composed of an interdisciplinary technical group of experts to identify, clarify and advise on technical and environmental management-related matters.

Step 4. Collect, analyze and manage information for ICM programme development and implementation

Information gathering is a primary activity in ICM programme development. The purpose is to provide decision-makers the needed information analyzed for decision-making as well as to keep stakeholders informed of the process. Both primary and secondary data are gathered from published information, gray literature or directly from field investigations. The data gathered are then analyzed, utilized and stored for future use.

a) **Types of information**
The development of an ICM programme requires a broad range of information across sectors and disciplines. The following are the key types of baseline information needed for policy and technical analysis with respect to the types, pressures, and risks to human and ecosystem health as well as the underlying causes.

- ***Demographic features:*** current density, geographical features, population size and distribution in the coastal areas reflecting the baseline conditions before ICM interventions;
- ***Cultural, political, ecological and socioeconomic characteristics of the area:*** pertinent baseline on political and administrative structures, economic and environmental policies, socio-cultural characteristics, economic development trends and the types and level

of ecosystem services. This is relevant information needed for future development of policy, legislative and other management interventions;

- ***Coastal users and types:*** types and level of coastal resource utilization, economic values, level of resource management, key issues, and impacts on sustainable livelihood and ecosystem services;
- ***Consumption and use patterns:*** implication of human food consumption and use patterns on products and services and their supply source as well as future impacts resulting from rising standards of living and urbanization;
- ***Environmental and sustainable coastal development issues and risks:*** identification of environmental threats, policy and management achievements or failures, their causes, and prioritization in terms of risks to ecosystem and human health;
- ***Existing rules and regulations:*** assessment of existing legal background for identification of effectiveness or deficiency of existing rules and regulations in sustainable coastal management and for determining areas for legal improvements.
- ***Public awareness:*** assessment of current public perception of the environmental and economic sustainability, ecosystem values, and evaluation of effectiveness of the NGOs, the government and public media in conveying these concerns to them for the purpose of developing efficient communication strategies and plans;
- ***Educational and scientific capacity:*** assessment of available research and educational institutions in the site or adjacent municipalities/provinces for identifying local institutional and individual capacity for providing scientific advice and technical support to the concerned local government;
- ***NGOs, industries and their activities:*** assessment of current roles of existing NGOs and key industries in environmental management and determining their possible future roles;
- ***Political opportunity and resistance to change:*** assessment of political environment conducive to the launching, development, and implementation of ICM programmes as well as the possible resistance from specific political or interest groups; and
- ***Local champions:*** identification of politicians, institutions, or distinguished private sector groups who might serve as local champions for ICM programme development.

b) Gathering information

The process of gathering information should closely follow that of the ICM cycle. The processes for generating various types of required information and reports are provided in Figure 2.5.

c) Accessibility and use of information

Accessibility of the available information and the ability to use it efficiently are as important as gathering them. The database collected must be carefully stored, managed and processed so that new information can easily be added with the onset of the following ICM cycle and that will be reflected by subsequent SOC reports. In this way, the database is continuously enriched and will become a valuable asset to the local government. An important challenge is to make this information available to other users in the area. This will need a clear data management and use policy to be set by the local government as most of the information is locally based.

d) Making information visible

In addition to using the gathered information for the preparation of an ICM programme, efforts should also be made to make analyzed information visible and easily understood by the policymakers and the public. In Manila Bay (Philippines), for example, the data collected from various agencies, research institutions and sampling locations for in-situ monitoring are presented in the form of a management atlas so that policymakers and the public can easily identify the parts of the coastline that are frequently

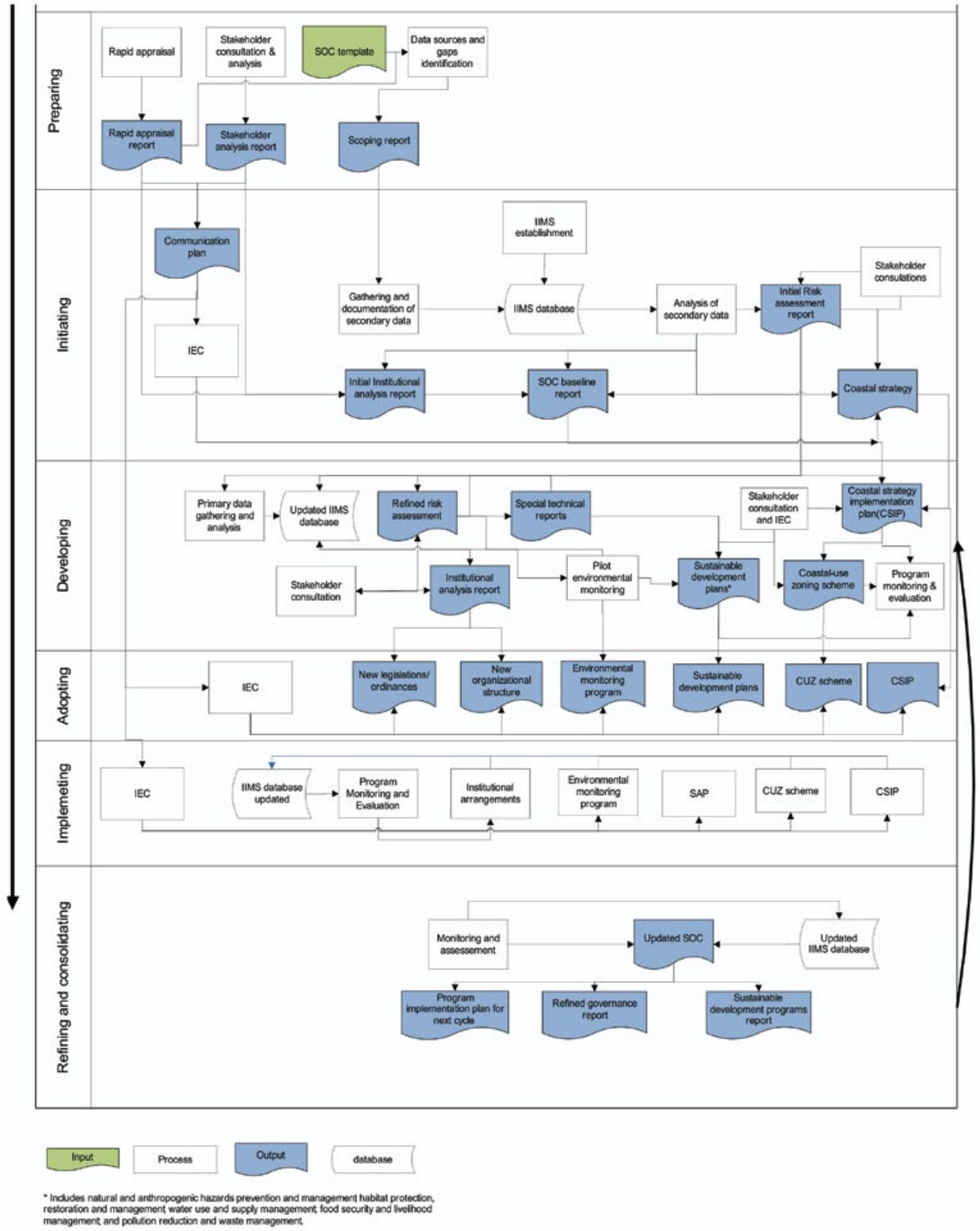


Figure 2.5. The ICM processes for generating information for the development of programme outputs and measuring of impacts (PEMSEA, unpublished).

inundated due to flooding, the areas that are contaminated by heavy organic pollution, the possible spread of the *E. coli* bacteria in the bay area, etc. (Figure 2.6).

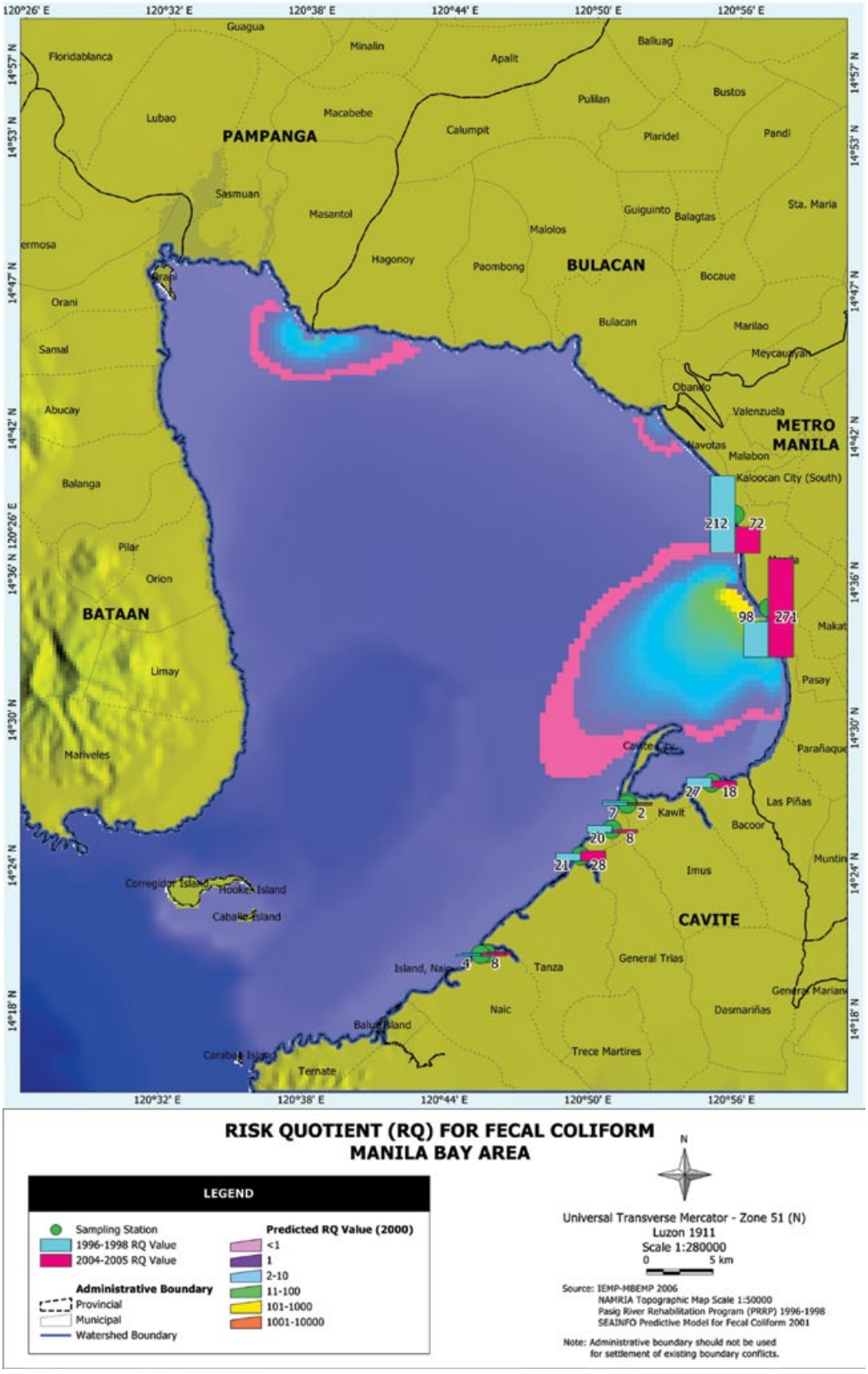


Figure 2.6. Making information visible as illustrated in the management atlas of Manila Bay showing severity of pollution from land discharge (PEMSEA and MBEMP-MBIN 2007).

Step 5. Develop coastal strategy and action plans

The information gathered in step 4 is analyzed and consolidated for the preparation of a coastal strategy and the development of issue- and site-specific action programmes based on a common vision and missions developed through consultation with all stakeholders. A shared vision sets the goals and development objectives of the local area and hence, becomes a vision of the local government in planning future economic development, control of pollution, eradication of poverty, conservation of biodiversity and response to natural and human-induced disasters, among others. Management policy can be developed through the ICM policy framework and process as given in Figure 2.7. A framework for the application of ICM is given in Chua (2006).

Step 6. Create public awareness

An important role of the ICM project office is to formulate and implement a communication plan that will help to improve public knowledge of the biodiversity value and ecosystem services from the coast and oceans (Figure 2.8). It is also imperative for developing an informed public well-versed on the goals and objectives of the ICM programme, its visions and missions, and the reasons underlying specific action plans. The purpose is to generate strong public support and participation during the process of ICM development and implementation.

Step 7. Secure approval and budget

This is a critical step that adopts the coastal strategy and the strategic programme plans by the local authority through a formal protocol. The adoption will mean the approval of either the full budget or just the core budget for plan implementation as the funds needed are highly variable and purpose-dependent. The ICM office, through the local government machinery, will then have to find matching funds or leverage for a co-financing scheme from external sources, such as global financing institutions and aid programmes, bank loans and/or from the private sector.

The purpose of mainstreaming is to ensure that the required budget could be co-shared by other environment and economic development agencies. Approval from the local authority should be realized as a natural process if the government agencies have been involved right from the beginning of the project.

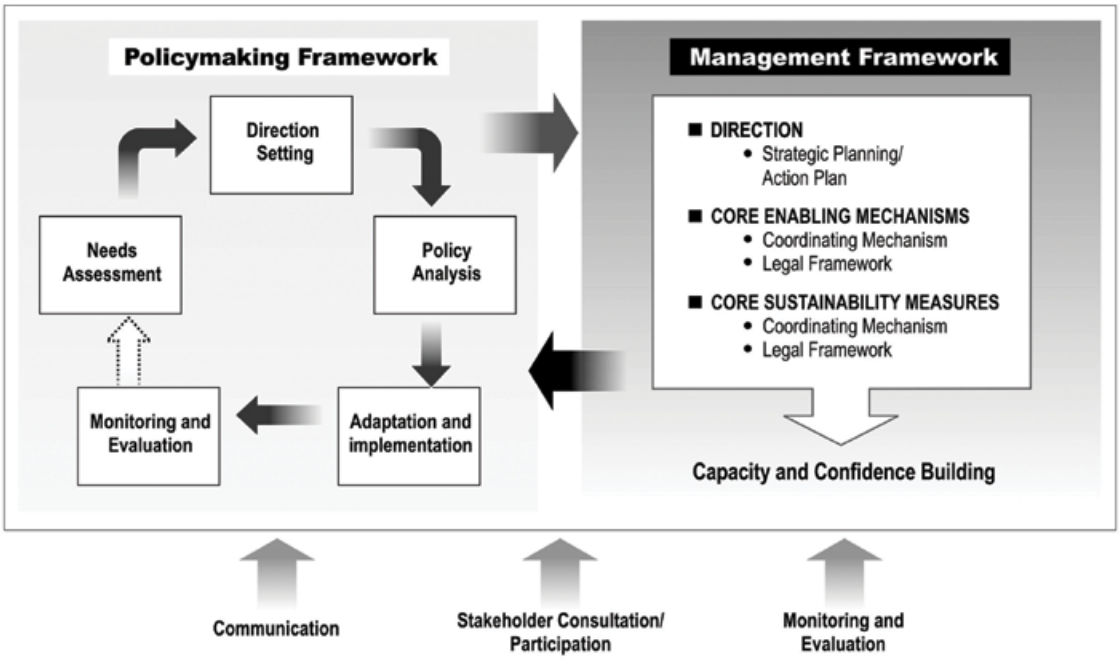


Figure 2.7. The ICM policy framework and process (Chua 2006).

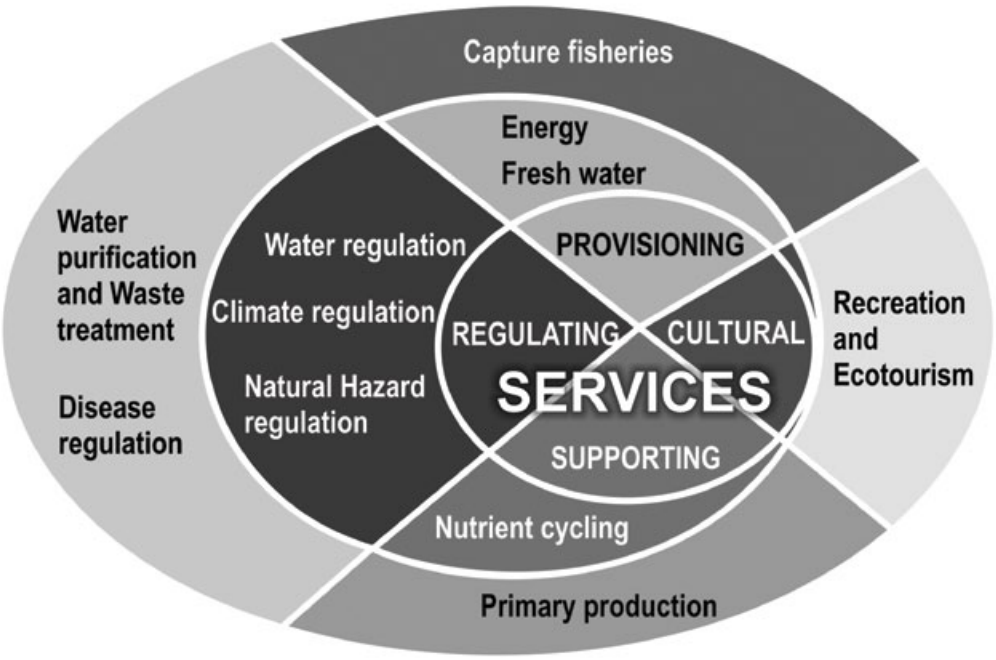


Figure 2.8. Schematic representation of ecosystem services (UNEP 2013).

Step 8. Implement Coastal Strategy Implementation Plan (CSIP)

The follow-on step will be the full implementation of the coastal strategy implementation plan (CSIP) within a specific timeframe. In most cases, CSIP is implemented in about two to three years within a five-year programme cycle. However, it is also possible to implement CSIP in the follow-on ICM cycle. CSIP is to be implemented by concerned line agencies according to their area of responsibility. Therefore, it is essential to ensure that the concerned line agencies internalize the relevant activities of the CSIP into their own operational agenda. The success of CSIP will largely depend on how the various line agencies can work together.

It is essential to take a longer-term strategy in developing and implementing the ICM programme as it might take more time than usual to generate the desired outcome based on performance indicators (Chua, 2006; Olsen, 2003).

Step 9. Monitor and evaluate progress and results

Over the duration of the CSIP implementation, it is necessary to conduct regular monitoring of progress and take stock of initial results using performance and result indicators. One approach for this is through the use of PEMSEA's state of the coasts template (PEMSEA, 2011). Hence, monitoring should begin as early as the initiation of the programme's implementation

Step 10. Prepare and release State of the Coasts Report

A concerted effort should be devoted by the ICM office to begin the preparation of a comprehensive report that will review the performance and impacts of ICM programme implementation. Figure 2.9 outlines steps in the preparation of a state of the coast report, as described by PEMSEA (2011). The main purpose is to update the concerned agencies participating in the ICM programme on progress made in the implementation of various activities and the impacts of those activities to allow the said agencies to review causes of achievements or failures and, where needed, come up with remedial actions to be taken for the follow-on cycle. Another objective is to enumerate the results in terms of achieved targets and present these in an integrated manner to a broader constituent of the society. Thus, the periodic release of a comprehensive report (at least every ICM cycle) will keep the stakeholders informed on how enhanced policy and management interventions have improved the coastal and marine environment.

Figure 2.9. Schematic diagram showing key stages in the preparation of a"state of the coast" report (PEMSEA 2011).

Step 11. Prepare the follow-on phase of ICM cycle

This last step is to make refinements to the activities that need to be undertaken in the follow-on phase following the same process of stakeholder consultation, adoption by the ICM coordinating committee, and approval by the local authority for implementation in the next cycle. The updated report should be an important reference document for future improvements of management policy and practices. This step marks the conclusion of the first ICM cycle and the start of the next. The stakeholders, the local government and ICM office staff should now be better equipped for the next and subsequent cycles.

2.6 USE OF ICM DYNAMICS TO ACHIEVE EFFECTIVENESS AND EFFICIENCY

Essential elements of ICM practices (driving forces), when applied skilfully, can act singularly or in combination to forge behavioural changes that are essential for improving coastal governance. The ability of ICM practitioners to use these driving forces, in many ways, determines the level of impacts and the resulting changes. The behavioural changes go through three phases: transition, transformation and sustainability, which collectively drive policy and management actions towards achieving the goals of ICM (Chua et al.,2006).

Adaptive learning

Enables modifications of management policies and practices through constant review and improvements by building upon successes and failures, and by increasing knowledge, skills, experiences, confidence and capacity, including the ability to meet new management challenges. Adaptive learning further drives the processes of ICM toward its maturation in coastal governance. Adaptive management overrides all the other driving forces but requires sound integrated planning, management and interpersonal skills to address different social, political, cultural and economic interests.

Vision

ICM practice creates a shared vision among stakeholders that responds to people's values, concerns and aspirations. The shared vision enhances unity, strengthens partnerships amongst stakeholders, provides a common aspiration for stakeholders and sets clear direction and mission that cultivate ownership.

Platform

Enables convergence of the sector's vision through regular consultative meetings of stakeholders, promotes and guides development and implementation of action plans, catalyzes certain processes and policies or management decisions, and enables management interventions to be evaluated and modified.

Awareness

Improves stakeholders' knowledge of the conditions of the coasts, including the social, economic and envionmental challenges over limited space and time; increases management transparency; and builds public trust, interest and commitment to catalyze informed actions.

Process

helps to achieve strategic targets through a series of linear or multidimensional processes, such as the planning, adoption, implementation, monitoring and reporting processes of the ICM cycle in achieving several management objectives.

Coordination

Reduces "turf" conflicts; facilitates interdisciplinary analysis of coastal management issues; and forges interagency and multisectoral cooperation through a common vision.

Integration

Integrates sector policies; increases complementarities; mainstreams agency functions; and mainstreams environmental management into the economic agenda.

Partnership

Forges ownership; pools human and financial resources; builds on collective wisdom and efforts; and culminates into a formidable driving force for change.

Coverage

Ensures ample breadth and scope of interconnected ecosystem management issues to be addressed within a confined geographical boundary including transboundary concerns. Coverage also enables land- and sea-use zoning or marine spatial planning.

Resilience

Increases the management capacity to adapt to changes either from natural or human-induced events; applies adaptive management and precautionary principles to respond to uncertainties; and strengthens preparedness and response by consolidating policy and management fundamentals.

2.7 EFFICIENT USE OF A BROAD RANGE OF TECHNICAL AND MANAGEMENT TOOLS

Essential techniques and tools used in ICM programme development and implementation include but are not limited to the following: risk assessments, ecosystem assessment, measurement of ecosystem services, integrated information management system, evaluation of trade-offs, natural resource valuation/accounting, sea-use zoning or marine spatial planning, integrated EIA/strategic

EIA, monitoring and evaluation for performance, state of coasts reporting, expert system, geographic information systems (GIS), plan-do-check-act (PDCA) framework, consensus building, rapid appraisal, role play and log frame. The application of many of these technical and management tools is given in chapter 8 of *The Dynamics of ICM* (Chua, 2006).

2.8 ICM CASE STUDIES

ICM has been applied widely in the East Asian Seas region through GEF/UNDP/PEMSEA projects over the last 20 years with varying degrees of success. There are more than 31 ICM initiatives in the region (Figure 2.10) operating at different levels and maturity. Only eight of the 31 sites have received technical and some financial support from the projects, and they are designated as the national ICM demonstration sites. The other 23 sites were developed mainly with the financial resources of the local governments and are designated by PEMSEA as ICM parallel sites. Information on these sites is available at the PEMSEA website (www. pemsea.org). These ICM practices form the basis for the construction of a standardized

Figure 2.10. Map of ICM practices in East Asian Seas Region.

ICM operating system. The starting points of these 31 sites are quite different; however, the processes of "learning by doing" and adaptive management continue to provide improvements to policy and management practices of all the sites as well as instilling confidence in the ICM approach. Despite financial and capacity challenges, the local governments in all 31 sites were able to sustain the ICM practices in their respective areas largely through their own budgets (Tropical Coasts, 2012).

Four selected ICM sites are briefly presented here to reflect different cultural, religious, political and socioeconomic conditions. Xiamen (China) and Batangas Bay (Philippines) are two demonstration sites established in 1994 during the first phase of the PEMSEA project while Sihanoukville (Cambodia) and Chonburi (Thailand), together with four others (Bali in Indonesia, Danang in Vietnam, Nampho in DPR Korea, and Port Klang in Malaysia) were established in 2001 during the second phase. These four sites were initially supported through partial financing from the Global Environmental Facility (GEF). Further information on these sites is available at www.pemsea.org.

Xiamen, China

Xiamen municipality is one of the earliest PEMSEA ICM demonstration sites, set up to test the validity of the ICM approach in 1994. Over a span of 20 years, Xiamen has grown from a semi-developed municipality into a highly urbanized city with an average GDP growth of 19 per cent and a population that grew from less than 1 million 20 years ago to over 4 million today, including rural immigrants. It has gone through a series of economic transformations to become one of the very successful special economic zones of China. Recognizing the severe impacts of economic development on environmental and social sustainability, the local government adopted the concept of ICM and undertook long-term integrated coastal planning and management to achieve its development goal to make Xiamen "a beautiful and prosperous port city". Today, after many years of concerted and systematic management efforts, addressing various sustainable coastal development challenges in a holistic manner, the city has indeed achieved its vision.

Through the ICM process, Xiamen successfully conducted the following coastal management initiatives: relocated aquaculture practices; cleared a congested navigational channel; established an efficient port control system to ensure port safety and environmental preservation; rehabilitated mangrove areas; safeguarded island and bay ecosystems and protected endangered species; treated more than 90 per cent of domestic sewage, 100 per cent of industrial waste and over 80 per cent of solid wastes; and effectively developed a natural disaster response system and greatly reduced human fatalities due to typhoons and storm surges. In addition to the aforementioned contributions, ICM provided benefits in the form of the complete termination of sand mining, the removal or relocation of polluting industries, the implementation of a functional zoning scheme for the coastal waters with local legislation and the rehabilitation of sandy beaches; and the landscaping ventures that make Xiamen a garden city.

Public awareness of environmental protection is strong and has greatly contributed to the success of several government initiatives in the rehabilitation of the degraded lagoons and bays. The scientific and educational communities also play strong technical and advisory roles in ensuring the use of science and technology in planning and management toward achieving the sustainable development goals.

Xiamen has recently completed its state of the coasts report, which provides a detailed analysis of the progress, outputs and outcomes arising from the last 19 years of ICM programme implementation. A summary of the assessment of the key performance indicators relative to the key elements "governance" and "sustainable development aspects" of the ICM programme is given in Figure 2.11. More detailed information on Xiamen's ICM programmes is available through PEMSEA publications (PEMSEA 2006 and 2006b).

Batangas Bay, Philippines

Batangas Bay is the second PEMSEA ICM site started in 1994 to test the application of the ICM approach in addressing cross-boundary environmental management challenges. The semi-enclosed bay, with a total water area of 220 km^2, is bordered by the mainland

Core Indicators for SOC Reporting for Xiamen Municipality

Category	SOC Code	Indicator	Trend * (1991–2010)
Governance			
Policy, strategies and plans	001	Coastal profile/Environmental risk assessment	Improving
	002	Coastal strategy and action plans	Improving
	003	Local government development plan, including coastal and marine areas	Improving
Institutional arrangements	004	Coordinating mechanism	Improving
	005	Participation of stakeholders in the coordinating mechanism	Improving
Legislation	006	ICM enabling legislation	Improving
	007	Administration and monitoring of compliance to legislation	Improving
	008	Environmental cases filed/resolved	Baseline data only or data not conclusive
Information and public awareness	009	Public education and awareness	Improving
	010	Stakeholder participation and mobilization	Improving
Capacity development	011	Availability/accessibility	Improving
	012	Human resource capacity	Improving
Financing mechanisms	013	Budget for Integrated Coastal Management	Improving
	014	Sustainable financing mechanisms	Improving
Sustainable Development Aspects			
Natural and man-made hazard prevention and management	015	Level of preparedness for disasters	Improving
	016	Degree of vulnerability to disasters	Baseline data only or data not conclusive
	017	Social and economic losses due to disasters	Improving
Habitat protection, restoration and management	018	Habitat management plan and implementation	Improving
	019	Areal extent of habitats	Baseline data only or data not conclusive
	020	Protected areas for coastal habitats and heritage	Improving
	021	Reclamation and conversion	Baseline data only or data not conclusive
Water use and supply management	022	Water conservation and management	Baseline data only or data not conclusive
	023	Access to improved water source	Improving
	024	Incidences/deaths due to waterborne diseases	—
Food security and livelihood management	025	Fishery management plan and implementation	Improving
	026	Fisheries production	Deteriorating
	027	Malnutrition rate	Improving
	028	Poverty, education and employment	Improving
	029	Livelihood programs	Improving
Pollution and waste management	030	Management plans	Improving
	031	Water quality	Improving
	032	Air quality	Baseline data only or data not conclusive
	033	Sanitation and domestic sewerage	Improving
	034	Municipal solid waste	Improving
	035	Industrial, agricultural and hazardous wastes	Improving

* **Legend:** Improving; Deteriorating; Baseline data only or data not conclusive; — No data

Figure 2.11. Performance of the core indicators of ICM practices in Xiamen, China (Municipal Government of Xiamen and PEMSEA, unpublished).

municipalities of Bauan, San Pascual, Mabini and Batangas City; Verde Island is positioned at the bay's mouth. Because of the number of municipalities with jurisdiction over portions of Batangas Bay, the provincial government, which sits in Batangas City, has taken the lead role in coordinating and implementing the ICM programmes for the bay. The Batangas Bay project has gone through several ICM cycles and has expanded its geographical coverage to include all relevant coastal municipalities of the province.

Batangas ICM now covers a land area of 1663 km^2, 7000 km^2 of water areas (including Taal Lake) and 492 km of coastline. The total population of the province is less than 2.25 million (according to the 2007 census) while most of the coastal municipalities have a small population of somewhere between 15,000 to about 70,000, except Batangas City which has a relatively larger population of more than 200,000. The ICM programme therefore has to address several pertinent transboundary issues across different municipalities and coastal areas of Batangas Province taking note that the economy of the province, which is largely agriculture- and industry-dependent, has moved towards the service sector, which constitutes more than 50 per cent of its GDP.

Under the national decentralization law, local governments are given much more responsibility in the management of areas under their jurisdiction, including the authority to enact local ordinances. As such, Batangas Province has established a Regional Environmental Protection Council, which is chaired by the governor; members of the council consist of representatives from NGOs, media, line agencies, private sector and the mayors of concerned municipalities. The council is the coordinating body for all ICM initiatives within the province.

A major characteristic of the Batangas ICM programme — and incidentally one of its most remarkable features — is the cooperation and support from the industrial sector, which provides significant financial support in the early phase of activities. The key industries bordering the Batangas Bay region formed a foundation, working closely with the local authority and other stakeholders in addressing key environmental challenges, such as oil spills, habitat degradation, land-based pollution, industrial waste discharge, reduction in fish catch and loss of livelihoods. Several action plans have been developed and implemented. Interagency coordinating mechanisms for the province and for each municipality have been established. Enabling legislation has also been developed to strengthen ICM implementation. Land and water use zoning for a selected municipality (Mabini) have been carried out and implemented. Natural hazard response, such as those for earthquake and typhoons, were likewise developed. Coastal and marine biodiversity conservation efforts have been intensified, including protecting and restoring mangrove habitats, strengthening coral reef management to stop coral mining and dynamite fishing, and setting up community-based marine protected areas.

Batangas Province has also completed its first state of the coasts report and several publications (Provincial Government of Batangas, Philippines and PEMSEA, 2008; PEMSEA, 2006a; MTE, 1996); a summary of the performance indicators is presented in Figure 2.12.

Sihanoukville, Cambodia

Sihanoukville, historically known as Krong Kompong Som, located along the Gulf of Thailand, is one of PEMSEA's six ICM demonstration sites. Like many parts of the country recovering from the protracted civil war, Sihanoukville is sandwiched between two immediate concerns: on one hand is the urgent need to prioritize the development of its economy in order to create employment and livelihood; on the other is the need to protect its coastal environment, conserve the relatively pristine ecosystems, maintain clean sandy beaches, safeguard the country's only natural marine reserve, and preserve the cultural heritage of the old kingdom. Local capacity was inadequate to develop and manage the coastal and adjacent marine areas in a sustainable manner. Despite the limitations of local capacity in terms of human and financial resources and technical know-how, the local government of Sihanoukville was able to implement the ICM programme with political and financial support from the central government and

Core Indicators for SOC Reporting for Batangas

Category	SOC Code	Indicator	Trend * (1990–2007)
Governance			
Policy, strategies and plans	001	Coastal profile/Environmental risk assessment	🙂
	002	Coastal strategy and action plans	🙂
	003	Local government development plan, including coastal and marine areas	🙂
Institutional arrangements	004	Coordinating mechanism	🙂
	005	Participation of stakeholders in the coordinating mechanism	🙂
Legislation	006	ICM enabling legislation	🙂
	007	Administration and monitoring of compliance to legislation	😐
	008	Environmental cases filed/resolved	😐
Information and public awareness	009	Public education and awareness	🙂
	010	Stakeholder participation and mobilization	🙂
Capacity development	011	Availability/accessibility	🙂
	012	Human resource capacity	😐
Financing mechanisms	013	Budget for ICM	😐
	014	Sustainable financing mechanisms	😐
Sustainable Development Aspects			
Natural and man-made hazard prevention and management	015	Level of preparedness for disasters	🙂
	016	Degree of vulnerability to disasters	😐
	017	Social and economic losses due to disasters	😐
Habitat protection, restoration and management	018	Habitat management plan and implementation	🙂
	019	Areal extent of habitats	😐
	020	Protected areas for coastal habitats and heritage	🙂
	021	Reclamation and conversion	☹
Water use and supply management	022	Water conservation and management	😐
	023	Access to improved water source	🙂
	024	Incidences/deaths due to waterborne diseases	😐
Food security and livelihood management	025	Fishery management plan and implementation	😐
	026	Fisheries Production	😐
	027	Malnutrition rate	🙂
	028	Poverty, education and employment	😐
	029	Livelihood programs	😐
Pollution and waste management	030	Management plans	🙂
	031	Water quality	😐
	032	Air quality	☹
	033	Sanitation and domestic sewerage	🙂
	034	Municipal solid waste	☹
	035	Industrial, agricultural and hazardous wastes	☹

* Legend: 🙂 Improving ☹ Deteriorating 😐 Baseline data only or data not conclusive — No data

Figure 2.12. Performance of the core indictors of ICM practices in Batangas Bay, Philippines (Provincial Government of Batangas and PEMSEA 2008).

technical support from PEMSEA's Regional Task Force. Although progress has been slow, the local government was able to follow the key stages of the ICM cycle in the planning and execution of the ICM programme. Sihanoukville was able to continue the ICM efforts into the second and subsequent ICM cycles with increasing local budgetary allocation.

A key achievement is the ability of the local government to put the necessary institutional arrangements in place, with the governor of Sihanoukville playing the lead role in facilitating the development of the coastal strategy and action programmes, in addition to the development of a clear vision that allows the integration of external aid programmes with that of ICM to avoid duplication and promote complementarity. There has also been a significant increase in local capacity to facilitate interagency coordination and undertake implementation of the finalized coastal strategy implementing plans. The ICM initiative was able to bring about greater cooperation between the various stakeholders and a stronger environmental stewardship that resulted in the ensuing successes: preservation of the ecosystems, especially the remaining mangroves and seagrass beds; strengthening the management of Ream National Park; enhancement of port safety and environmental management of the Sihanoukville port; development of water quality monitoring; enhancement of micro financing for village-scale domestic sewage disposal; and undertaking coastal functional zoning.

Finally, significant achievements have been made in the implementation of a beach management scheme that ensures villagers' participation in the protection, clean-up and management of selected beaches. For example, a small investment (USD 41,000) by GEF/UNDP/IMO/PEMSEA in 2004 for the planning and community management of the Occheauteal Beach has catalyzed national government financial contributions amounting to USD 235,146 for improvement of public facilities along the beach as well as private sector contributions totalling USD 613,453 to undertake similar efforts in two nearby beaches, Serendipity and Otress, which follow Occheauteal's model of management[4]. The efforts have resulted not only in an increased number of tourists visiting the beaches and increased income of the participating members but also in generating employment for the beach community. In May 2011, the Cambodian Bay, enclosed by these beaches, was admitted as a member of the Most Beautiful Bays of the World.

Chonburi, Thailand

Chonburi is a coastal province in Thailand, 80 km southeast of Bangkok, and is well-known for its aquaculture, natural resources and marine fisheries. Beginning in the early 1980s, the province was developed as a new economic zone, a gateway for imports and exports, and a new energy hub for the country. The rapid development and urbanization since then has posed threats to its ecological resources, cultural heritage, social security, economic growth and overall quality of life.

The ICM programme was initiated in 2001 by the Chonburi provincial government with the specific purpose of strengthening local government capacity to cope with the aforementioned challenges in an integrative and holistic manner. The project placed due consideration to harmonizing economic development with environmental protection and conservation; it also created broad-based stakeholder participation especially in forging community participation in line with government decentralization efforts.

Over the years, ICM implementation in Chonburi has established a mechanism where local governments and various stakeholders collaborate to solve common problems. Guided by a high-level multi-agency and multi-sectoral Provincial ICM Coordinating Committee headed by the governor and through the coordination of an ICM Programme Management Office — hosted initially by Sriracha Municipality and now by the Chonburi Provincial Administrative Organization — the province has utilized the Chonburi Coastal Strategy as a common long-term framework for collaborative planning, sharing of good practices and consolidation of efforts related to coastal and environmental management, integration of key actions into annual municipal development and budget plans, and scaling-up of ICM implementation to cover the entire province,

4 Information contributed by Belyn Rafael, PEMSEA

while mainstreaming ICM into the government development programme.

Following the adoption of the Chonburi Coastal Strategy in 2004, a Coastal Strategy Implementation Plan (CSIP) or ICM Action Plan has been prepared every three years in line with the local development planning process, identifying key actions and responsibilities to address priority issues, financial resources available from local and national sources, and areas needing support from various partners. Initial implementation of the CSIP in 2006 focused on stakeholder education and mobilization and demonstration of multi-sectoral and innovative approaches for mangrove rehabilitation, seagrass transplantation, sea turtle and crab conservation, eco-friendly mussel farming, community-based solid and liquid waste management and selected scientific research to address specific management concerns.

One of the demonstration projects aimed to reduce the volume of municipal and household solid waste being transported to disposal sites was through the establishment of "garbage banks" in schools and communities. Members of the garbage banks accumulate points equivalent to deposited reusable/recyclable materials, which are recorded in passbooks and redeemed in cash or in kind. A 75-day monitoring in Sriracha Municipality in 2008 showed that from a disposal rate of 35 t/day, 385 t of paper, plastic and glass bottles were separated, of which approximately 10.6 t were recyclable. On average, around 5.13 t of solid waste were collected in the garbage banks per day, representing approximately 15 per cent of waste generated daily in Sriracha Municipality. Replication of the garbage bank in other areas in Chonburi was supported in part by the UNDP–GEF–Small Grants Programme (SGP) projects under the PEMSEA–SGP Joint Communiqué. Over 200 garbage banks have been established in communities and schools in Chonburi Province.

Another demonstration project, aimed at protecting and conserving blue swimming crabs, involved establishing "crab condos", a stack of basket containers that are hung in rafts out at sea to provide temporary refuge for berried female crabs (carrying eggs) until they are able to spawn. Following initial demonstration in Sriracha Municipality in 2006, fishers observed an increase in crab catch from 40 kg/boat/day in April 2006 to 100 kg/boat/day in April 2007. Replication of the crab condo to other areas was supported in part by GEF–SGP as part of the PEMSEA–SGP Joint Communiqué. Crab condos have been in operation for several years in five municipalities.

Through a combination of long-, medium- and short-term strategies to demonstrate the ICM approach and benefits, ICM implementation in Chonburi Province scaled up from the initial demonstration area covering 5 municipalities and 27 km of provincial coastline in 2001 to 26 local governments covering the entire 160 km provincial coastline in 2008 and 99 local governments covering the entire province in 2010.

Over the years, capacity and confidence for ICM implementation in Chonburi has continued to grow, and the existing multi-stakeholder processes and arrangements in the province have been utilized to deal with current and emerging concerns, including coastal erosion and climate change adaptation. Under the ICM framework, 26 coastal municipalities have collaborated to highlight the issue of coastal erosion in the province and have obtained multi-year funding from the central government for coastal erosion management (*note: The above information was contributed by Cristin Ingrid Narcise, PEMSEA*).

Chonburi has also completed its state of the coast report, with an impressive list of achievements. Details of some specific achievements are given in Kanchanopas-Barnette et al. (2012) and Khunplome and Wiwekwin (2008).

3. CONTRIBUTION OF ICM TO ACHIEVING THE VISION AND MISSION OF THE CBD STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

This section places special focus on identifying necessary conditions to achieve the vision and mission of the Strategic Plan for Biodiversity 2011- 2020 and how ICM could make positive contributions in terms of meeting the principles of the ecosystem approach and the application of its methodologies and tools in achieving the Aichi Biodiversity Targets.

3.1 NECESSARY CONDITIONS TO ACHIEVE THE VISION AND MISSION OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

The Strategic Plan for Biodiversity 2011 – 2020 was adopted by the Parties to the Convention on Biological Diversity at its 10th meeting (COP 10) in Nagoya, Japan in 2010. The vision statement reads: "By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people". To achieve this vision, COP 10 set the following mission for the implementation of the strategic plan: "Take effective and urgent action to half the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, contributing to human well-being, and poverty eradication. To ensure this, the pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach". The Strategic Plan sets specific goals and 20 targets, collectively known as the Aichi Biodiversity Targets. Countries are expected to implement this ambitious Strategic Plan and achieve the targets by 2020 (some targets, however, are meant to be achieved by 2015).

Although the Strategic Plan has set time-bound targets, the ability to achieve all the set targets within the timeframe might vary from country to country. To achieve the vision and mission of the strategic plan, it is essential that the following basic enabling conditions necessary for practical implementation on the ground must be present: (1) enabling environments, such as relevant policy, legislation and support mechanisms in facilitating paradigm shifts in planning and management; (2) capability to plan and manage biodiversity resources in a sustainable manner; (3) sound public support for the preservation of ecosystems and sustainable use of ecosystem services; and (4) standardized methodology that has been proven efficient in holistic and integrative planning and management of biodiversity resources. These four enabling conditions are unfortunately not fully present in most countries, particularly in developing countries; moreover, the absence of such enabling conditions has become a barrier to effective biodiversity conservation and sustainable use.

3.2 HOW ICM CONTRIBUTES TO ACHIEVING THE VISION AND MISSION OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011–2020 AND THE AICHI BIODIVERSITY TARGETS

The evolution of ICM into a management system has allowed a more systematic and standardized approach to address a range of coastal and marine environment issues and sustainable development challenges, including biodiversity concerns. As such, ICM could provide an operational framework for implementing the Strategic Plan for Biodiversity and achieving the Aichi Targets, especially at the local level.

Relevance of ICM as it relates to the principles of the ecosystem approach

The ecosystem approach has been widely adopted and applied for the sustainable management of fisheries and other marine living resources, with a view to balance biodiversity conservation with the need to sustainably utilize these natural resources (Garcia, 2003; CBD 2004; Shepherd, 2004). The CBD further defined 12 principles to guide the incorporation of the ecosystem approach in biodiversity conservation and sustainable use (CBD, 2004). A review of ICM operational modality shows that it closely follows the principles of the ecosystem approach (Table 3.1) or the more commonly known ecosystem-based management (EBM) approach, as both ICM and EBM operational models are guided by the basic principles of sustainable development.

Based on experience in different regions and in a range of environmental, social-economic and political contexts, it has been demonstrated that ICM can contribute to the implementation of the CBD Strategic Plan. ICM uses local government and stakeholders as the key driving force for change, thereby promoting public support, financing sustainability and mainstreaming sustainable development

Table 3.1. Integrated coastal management as it relates to the principles of the ecosystem approach.

Ecosystem Approach (CBD decision V/6)	Integrated Coastal Management
1. Management objectives are a matter of societal choice.	1. Policy and management measures are developed based on the common vision of the society and agreed upon through close stakeholder consultation and participation.
2. Management should be decentralized to the lowest appropriate level.	2. The local government is the key driver for the development and implementation of strategies and action plans.
3. Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.	3. The holistic and integrative approach in coastal and marine planning identified the types and scales of ecosystems to be managed, while risk assessment ensures the types and level of ecosystem and human risks the target and adjacent ecosystems will be affected. Scaling up of ICM practices across jurisdictional boundary to cover the entire target ecosystem is facilitated.
4. Potential gains from management are recognized:there is a need to understand the ecosystem in an economic context, considering, e.g., mitigating market distortions, aligning incentives to promote sustainable use, and internalizing costs and benefits.	4. In addition to the primary objective of biodiversity conservation, ICM realizes the potential gains in terms of increasing values of ecosystem services, such as eco-tourism, but it is also aware of market distortion, which may drive development beyond the sustainable capacity. As such there is a need to mitigate such market distortion by emphasizing sustainable use and internalizing costs and benefits in all management measures.
5. A key feature of the ecosystem approach includes conservation of ecosystem structure and functioning.	5. Biodiversity conservation and use is one of the five key sustainable development aspects of an ICM programme to be addressed through a holistic management approach taking into full consideration ecosystem structure and functioning, utilizing the best available scientific knowledge.
6. Ecosystems must be managed within the limits of their functioning.	6. ICM is an ecosystem-based approach and thus any management measures are assessed and implemented within the limit of the ecosystem resilience.

Ecosystem Approach (CBD decision V/6)	Integrated Coastal Management
7. The ecosystem approach should be undertaken at the appropriate scale.	7. ICM initially operates within the municipal/city/provincial jurisdictional boundary as the local government is fully in control of planning and implementation, as well as local legislation and ordinances. . Scaling-up of ICM practices across jurisdictional and ecosystem boundaries could then be undertaken.
8. Recognizing varying temporal scales and lag effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.	8. ICM's cyclical process (between three and five years) in developing management actions has taken a longer timeframe based on risk priorities, capacity, financial resources, stakeholders support and the availability of scientific information on ecosystem response to management interventions.
9. Management must recognize that change is inevitable.	9. The reason to place management responsibility under the local government is to ensure a systematic approach in developing interagency and stakeholders' consensus to management interventions and acceptability of the consequent changes as a common desire.
10. The ecosystem approach should seek the appropriate balance between conservation and use of biodiversity.	10. ICM endeavours to achieve the broad objective of balancing environmental and conservation objectives and that of economic development through promoting the sustainable use of ecosystem services.
11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.	11. Through scooping of available primary and secondary information, including traditional knowledge, ICM enables the analysis of pertinent information relevant to sustainable use of ecosystem services to enhance management practices, including community-based management and co-management practices.
12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.	12. Involving all stakeholders, including scientific, educational, business communities, NGOs, as well as relevant government agencies is a standard ICM practice. The mechanism for scientific advice has been integrated into the coordinating structure of the governance framework.

(including biodiversity) concerns into the national and local economic development agenda.

ICM as an operational tool in achieving the Aichi Biodiversity Targets

More specifically, ICM's contributions to the implementation of the Strategic Plan are as follows:

a) It provides a broad integrative planning and management framework for achieving individual or combined Aichi Targets through the process of ICM programme planning, development and management cycle;

b) Its governance framework facilitates the development of enabling environments including appropriate policy or legislation that promotes biodiversity conservation and sustainable use of ecosystem services, target-oriented action plans, coordinated institutional arrangements, innovative financing, effective use of information and capacity development through "learning by doing";

c) It addresses a variety of environmental and resource exploitation concerns as well as socioeconomic challenges, such as unemployment and poverty, which not only affect the functional integrity of ecosystems but also the social well-being of the concerned area. These issues need to be addressed if the Aichi Targets are to be achieved;

d) It builds favourable working conditions that enable different concerned line agencies to reinforce each other in plan development, implementation, and monitoring of outputs and outcomes as well as joint reporting of results;

e) ICM makes full use of scientific and traditional knowledge as well as scientific techniques (such as DPSIR or Driving force—Pressure—State—Impact—Response) in analyzing and developing management response, which is essential in biodiversity conservation and sustainable use. The precautionary principle, however, is always adopted in cases where there are knowledge gaps and scientific uncertainties. This is more so in ecosystem-based management, where difficulties are frequently encountered when identifying the full range of ecosystem functions and values;

f) Adaptive management is part of the ICM process to ensure continuous improvement of management policy and practices. Such an approach is equally important for biodiversity conservation and sustainable use;

g) The participatory approach and consensus building process of ICM could be equally applied for biodiversity conservation and sustainable use;

h) The ICM cycle allows a systematic and incremental approach to achieve the Aichi Targets;

i) The dynamics of ICM facilitate a gradual and incremental approach to achieving the vision and mission of the Strategic Plan through wise application of the key ICM driving forces;

j) ICM builds local capacity by focusing on institutional and individual capacity development through field operations on the ground level; and

k) The incorporation of biodiversity conservation and sustainable use within the ICM programme framework could increas

Table 3.2 describes in detail how ICM contributes to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets.

Table 3.2. Contribution of ICM to the implementation of the CBD Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets.

Integrated Coastal Management	Strategy A				Strategy B								Strategy C		Strategy D				Strategy E		
A. Components of ICM	20 Aichi Biodiversity Targets																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
(i) Governance																					
1. Policy, strategies and plans		X	X	X	X	X	X	X	X	X	X	x		x	x	X	X				
2. Institutional arrangements	X		x	x	x	x	x	x	x	x	x	x		x	x	x	x				
3. Legislation			x			x	x	x	x	x	x	X		x	x	x	x				
4. Information and public awareness	X	x	x	x	X	x	x	X	x	x	x	X		x	x	x	x				
5. Financing mechanism			x		x	x	x	X		x	x						x				
6. Capacity development	x	x	x	x	x	x	x	X	x	x	x	x		x	x	x	x				
(ii) Sustainable Development Aspects																					
1. Natural and man-made hazards prevention and management	x					X				X				X	X	X	x				
2. Habitat protection, restoration, and management	x	x	x	x	X	X				X	X	x		X	X	X	x				
3. Water use and supply management	x					X				X				X	X	X	x				
4. Food security and livelihood management	x	x	x	X		X	X			X		x		X	X	X	x				
5. Pollution reduction and waste management						X		X	X	X				X	X	X	x				
(iii) ICM Development and Implementation Process (ICM Cycle)	x	x	x	X	x	X	x	x	x	x	x	x		x	x	x	x				

Integrated Coastal Management	Strategy A				Strategy B						Strategy C			Strategy D				Strategy E		
(iv) Partnerships	x	x	x	X	x	X	x	x	x	x	x	x		x	x	x	x			
(v) Monitoring, Evaluation and Reporting (State of the Coasts Reporting)	x	x	x	X	x	X	x	x	x	x	x	x		xx	xx	XX	XX	xx	xx	xx
B. ICM Scaling Up and Mainstreaming	xx	xx	xx	xx	xx	Xx	xx	xx	xx	xx	xx	xx	xx	XX	XX	XX	XX	xx	xx	xx

Notes:
x indicates achieving the Aichi Biodiversity Targets through the use of the key elements of the integrated coastal management system.
X indicates the key ICM component capable of achieving the Aichi Biodiversity Targets.
XX indicates implementing the CBD Strategic Plan through ICM implementation, scaling-up and mainstreaming.

4. PRACTICAL GUIDELINES FOR ADDRESSING THE AICHI BIODIVERSITY TARGETS THROUGH ICM AND ITS SCALING-UP

This section provides a set of practical guidelines and procedures for achieving the Aichi Biodiversity Targets through the development, implementation and scaling-up of biodiversity-focused ICM programmes. The practical guidelines are intended to assist coastal management practitioners charged with the responsibility of implementing the CBD Strategic Plan for Biodiversity 2011–2020 by incorporating the Aichi Biodiversity Targets into the ICM policy and management framework. The guidelines cover the application of the coastal governance framework, the procedures and operation of the coordinating mechanism, the application of participatory and ecosystem approaches as well as the strategic planning and implementation processes for achieving the goals and targets of the Strategic Plan at the local level. As the local political, ecological and socioeconomic conditions vary from place to place within and across countries, the guidelines should be used and adapted to local conditions. As such, each ICM programme is unique. The dynamics of ICM require a high degree of broad management knowledge across disciplines and sectors as well as the much-needed intuitive thinking in making decisions. This section also proposes the incorporation of the biodiversity-focused ICM programme into National Biodiversity Strategies and Action Plans (NBSAPs) to establish a standardized methodology for national scaling-up.

The present practical guidelines should be used in the context of achieving the 20 Aichi Targets at the local level. They are not intended to replace other national efforts in biodiversity conservation through alternate methodologies aimed at achieving the same targets. The guidelines are meant to take full advantage of the already tested integrated governance and management framework that can definitely enhance or at least complement other initiatives, such as ecosystem-based management and marine spatial planning.

4.1 THE ADVANTAGES OF APPLYING ICM

Coastal management practitioners or those from the environmental protection and conservation agencies who are charged with the responsibility of implementing the Strategic Plan for Biodiversity 2011-2020 need to be convinced themselves of the benefits of applying the ICM concept and practices for achieving the strategic goals and targets set by the CBD so they can be in a better position to persuade others. The following are some of the key advantages:

1. Global efforts for achieving the CBD Strategic Plan and its Aichi Targets begin with local-level implementation in each country. The ICM system can provide the needed comprehensive integrated planning; science-based, adaptive management approaches; policy and management frameworks; operating processes; stakeholder consultation platforms; as well as the relevant methodologies for making local implementation possible.
2. The ICM system addresses most of the major political, institutional, information, socio-economic and capacity-related obstacles that impeded the implementation of the previous CBD Strategic Plan (2002-2010; www.cbd.int/sp/2010; Prip, et al., 2010). The structure of the ICM system enables these obstacles to be addressed in a systematic and progressive manner. The governance component of the ICM system aims to remove these hindrances to implement the plans by developing the necessary policy, ordinances, financing, institutional and human resources support to create an enabling environment and forge partnerships

for coordination and integration of strategies and action plans and their implementation.

3. Achieving the Aichi Biodiversity Targets will be more cost-effective if they are integrated into the overall sustainable development programme of the local government agenda that also simultaneously addresses other related concerns, such as disasters, pollution, livelihood, overexploitation, climate change and freshwater shortage. Not only will externality challenges of biodiversity conservation be addressed collectively in the context of sustainable use, but biodiversity issues will also be given adequate attention and importance within the ICM programme as part of the local government agenda.

4. The ICM cycle enables the systematic and gradual achievement of the Aichi Targets especially in developing countries where human and financial resources are limited but where the socio-economic demands, such as poverty eradication and employment, are far more important. The ICM cycle creates the needed resiliency to enable local governments with less capacity to gradually increase their critical mass of public support, technical capacity and financial resources to cope with rapidly escalating environmental challenges.

5. ICM communication plans are both general and target specific. Conservation issues are already included in information campaigns not only for raising public awareness regarding the relevance of biodiversity conservation but also for elucidating to stakeholders the need for nature reserves, marine protected areas and the protection of endangered species. ICM communication plans could be further intensified and should include more of the biodiversity concerns, where necessary.

6. ICM enables a more balanced and yet comprehensive approach to ensuring sustainable economic development and environmental protection, including conservation, so that the final programme can be mainstreamed into the local development agenda. Conservation and other environmental as well as socioeconomic issues are evaluated based on assessments of their risks to human and ecosystem health; these are then prioritized for management interventions. This is particularly important as nature conservation is conventionally low on the government priority agenda.

7. The success of local achievement of the Aichi Targets through ICM implementation will likely serve as a demonstration for replication, multiplication, and scaling-up of similar practices throughout the country, region and the world at large.

One of the common challenges in the initiation of ICM practices is the question of who should take the lead to initiate and who should be responsible for implementing the programme. ICM is not merely a scientific exercise although it does need the expertise of scientists to provide it with reliable information. It is also not just a matter of enforcing laws or ordinances, nor an economic programme to create jobs, generate livelihood and spur economic growth. More than a sum of these components, an ICM programme should be recognized as a sustainable coastal development programme for achieving both the national and global objectives outlined in Agenda 21, and the outcomes of UNCED and WSSD.

As mentioned in earlier sections, the local government is the driving force for change. It is through local governments' operational mechanism that ICM could make a difference. Thus, it is obvious that the local government should take the reins in initiating ICM practices. On the other hand, some – if not most – local governments in developing countries may not have the necessary integrated management capacity to do so. Technical assistance from the national government, international or regional organizations, international aid agencies, or non-governmental organizations can be an appropriate option to make the first initiative.

4.2 INTEGRATING STRATEGIC GOALS A TO E (AICHI BIODIVERSITY TARGETS 1 TO 20) INTO AN ICM PROGRAMME

Identifying the Aichi Biodiversity Targets with the essential components of ICM

At the onset, biodiversity-focused ICM initiators should first identify and prioritize their Aichi Targets depending on their objectives, mandates and resources. They should then integrate each individual target with the key component elements of the ICM system (Section 2, Fig. 2.3). Biodiversity concerns can be addressed individually, in groups, or as a collective whole through implementation of the various elements of the ICM components within an overall framework of sustainable development.

Most of the Aichi Targets related to preserving biodiversity values (Target 2), reducing or removing subsidies (Target 3), preventing continued loss of natural habitats (Target 5), protecting coastal and marine ecosystems (Target 11), preventing species extinction (Target 12), maintaining genetic biodiversity (Target 13), safeguarding ecosystem services (Target 14), and strengthening ecosystem restoration and resilience (Target 15) can be achieved through the Sustainable Development Programme subcomponent if the ICM programme on "Habitat Protection, Restoration and Management" whilst the targets related to sustainable management of marine living resources (Target 6) and sustainable aquaculture (Target 7) can be attained through the subcomponent on "Food Security and Livelihood Management", which addresses the challenges of overexploitation and use of marine living resources, sustainable harvest and aquaculture practices.

Other Aichi Targets, such as 8, 9 and 10, which are related to nutrient pollution, invasive alien species, and acidification, respectively, can be realized through the subcomponent of the ICM programme on "Pollution Reduction and Waste Management". The partnership-building efforts of ICM could contribute to achieving Aichi Target 4 on public participation while setting up a group of scientific experts within the ICM framework ensures that strategies and action programmes are based on scientific findings, thus contributing to achieving Target 19 on science-based knowledge. The CBD Strategic Plan for Biodiversity to increase public awareness (Target 1), access and conserve genetic resources (Target 16), use of traditional/indigenous knowledge and practices, innovations and implementation of international conventions (Target 18) and mobilizing financial resources (Target 20) can be accomplished under the governance component of the ICM system as these targets require policy direction, implementing strategies, financial innovations and human resources. It is clear that all the Aichi Targets can be addressed through wise application of the policy and management component elements of the ICM system.

Integrating Aichi Biodiversity Targets 1 to 13 into ICM programmes

The CBD has set five global strategic goals to be achieved through the 20 Aichi Targets at local, national and regional levels.

a) **Strategic Goal A** is aimed at addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society. This goal is to be realized through achieving Targets 1 to 4. At the national level, ICM can contribute to achieving these four global targets in the following manner:

Target 1

Increase public awareness throughout ICM programme development and implementation processes through its communication plans to create an informed public who understands and appreciates the diverse values of biodiversity. In addition, such communication plans should strengthen political will to support management efforts in preserving biodiversity resources and their sustainable use. Public awareness is incorporated as an essential part of the governance framework of the ICM programme.

Target 2

Integrate biodiversity values in appraising ecosystem services for the purpose of local development planning processes to ensure the implementation of strategies and action plans that will guarantee sustainable use of biodiversity. This is done during the ICM process of natural accounting for identifying and quantifying the contributions of the goods and services provided by the ecosystems to the local economy.

Target 3

Reforming inappropriate incentives and actions to comply with the Convention on Biological Diversity and other multilateral environmental agreements on biological diversity will require national endorsement and support to be effective. Within the jurisdiction of local governments, however, appropriate reforms can be made through enacting or implementing ordinances or administrative measures to phase out subsidies that are harmful to biodiversity conservation or to provide positive incentives to promote biodiversity conservation and sustainable use. Nevertheless, if national legislation is already available, the local government can incorporate such reforms through its strategic ICM action plans.

Target 4

Implementing plans for sustainable production and consumption is part of the actions to be undertaken through the "Food Security and Livelihood" subcomponent of the ICM programme. The Strategic Plan for Biodiversity was developed to promote and achieve sustainable harvests, stop or reduce unsustainable fishing, and enhance sustainable aquaculture practices. Efforts are also made to promote behavioural changes among the locals to reduce food wastage, poaching of endangered species, and use of illegal fishing methods.

b) **Strategic Goal B** is aimed at reducing the direct pressure on biodiversity and at promoting sustainable use through achieving Targets 5 to 10. These targets match the objectives of ICM and can be achieved through ICM programme implementation in the following manner:

Target 5

Habitat loss could be effectively reduced, completely stopped or even gradually but steadily reversed at local level through the application of ICM. Among its objectives, ICM aims to reduce the pressures that cause habitat destruction and degradation such as coastal reclamation, unsustainable harvesting and other coastal conversion activities. In the context of ICM, appropriate policy measures and management plans are developed and implemented for regulating human activities from further damaging the functional integrity of the habitats, for promoting sustainable use of the goods and services and for undertaking restoration programmes, such as restoration of wetlands and sea-grass beds.

Target 6

Sustainable management of coastal and marine living resources is an important component of the ICM programme, the implementation of which contributes to achieving sustainable management and harvest of fish, invertebrates and aquatic plants in the coastal and marine areas. In applying ICM, the local government will be more effective in implementing policies, legislative and management measures to eliminate illegal fishing or at least minimize sectoral and cross-sectoral barriers that impinge on the sustainable harvest and use of living resources instead of putting in place fish stock recovery programmes.

Target 7

Achieving sustainable aquaculture practice is one of the major strategies and goals of the subcomponent of the ICM programme on "Food Security and Livelihoods".. Its implementation will contribute to achieving Aichi Biodiversity Target 7. ICM efforts on this aspect are directed toward the following objectives: arresting the conversion of wetland and coastal

lowland into shrimp farms; reducing intensive farming of fishes high in the food-chain such as groupers and snappers using trashed fishes as feeds; reforming cage culture practices to lessen or avoid ecological damage to bottom ecosystems; and encouraging extensive polyculture systems in open coastal waters that effectively take advantage of the various levels of food chains.

Target 8

Reducing pollution from land and sea is a major goal of ICM; hence, implementing the subcomponent of the ICM programme on "Pollution Reduction and Waste Management" will undoubtedly contribute to the Aichi Target on pollution reduction. The ICM places great emphasis on efforts to reduce land discharge from sewage and industrial wastes as well as oil and chemical pollution from ships. Pollution management is a costly measure requiring sizable financial resources and substantive expertise for treating the large amount of pollutants discharged into the sea. In this respect, the local government can play an important role in enforcing strict controls on areas where pollution is not yet a threat to ecosystem functioning, in installing treatment facilities for untreated domestic and industrial wastes and in regulating discharge, including those from non-point sources.

Target 9

Preventing and regulating the introduction and spread of invasive alien species are measures undertaken to reduce their harmful impacts on indigenous species and on the alteration of the biodiversity of a certain habitat or ecosystem. Although invasive alien species have been introduced in various ways, those introduced through ballast water discharge by ships are found to have the most profound global ecological impacts. The contribution of ICM to the achievement of this target is limited to imposing stricter control over the introduction of alien species under respective national legislations. Local government should work closely with the transport ministry and port authority in implementing the IMO Convention for the Control and Management of Ships Ballast Water and Sediments (2004).

Target 10

Reducing pressures on vulnerable ecosystems shares the same goal as ICM, which strives to protect ecosystem functions to ensure their sustainable supply of goods and services. This target can be met through implementing the key subcomponents of the ICM system, especially protecting, restoring and managing habitats; reducing pollution, which threatens ecosystem functions; regulating overexploitation of living resources; increasing public awareness; moderating human consumption and use patterns; and improving livelihoods. These actions are collectively undertaken to minimize further human pressures on the remaining ecosystems.

c) **Strategic Goal C** is aimed at improving the status of biodiversity through achieving Targets 11 to 13 by safeguarding species, ecosystems and genetic diversity. As biodiversity conservation is an inseparable component of the ICM programme, implementing ICM practices is thereby expected to contribute to, among others, this strategic goal.

Target 11

Increasing the size of biodiversity-rich marine areas and improving management of existing nature reserves and protected areas will lead to the realization of this target. The local government is in the best position to coordinate or network the management of existing marine protected areas (MPAs), to facilitate community-led efforts to protect and regulate human activities, as well as to facilitate environment-conscious corporations to contribute to the sustainable management of existing and new MPAs. ICM promotes the sustainable management of existing nature reserves or MPAs within the jurisdictional boundary of the local government. ICM seeks to demonstrate that conserving biodiversity within the local government

management jurisdiction is not only a global obligation but also a way to benefit from the sustainable supply of ecosystem services. One way of turning biodiversity conservation into tangible economic benefits is the development of ecotourism, which has been shown to generate enormous income that contributes to both local and national coffers.

Target 12

Species extinction can be prevented or decreased if national and local governments pay serious attention to the IUCN Red List of Threatened Species. The local government could make a significant contribution to reducing the loss of endangered species or critically endangered species through its ICM programme with the support of national policy and legislation as well as international conventions that govern the exploitation and use of threatened species. It can make use of its public awareness campaigns and mass communication plans to mobilize public support for its conservation measures. In fact some local governments have been able to effectively turn activities protecting threatened species into visible ecotourism targets (such as the white dolphins in Xiamen, China), thus making preservation not only responsive to public demand but also able to generate supplementary financial resources.

Target 13

Maintaining genetic biodiversity is seldom considered the responsibility of the local government and has always been regarded as an obligation of the national authorities. In fact, there has been little effort in the past that demonstrate how local governments could contribute to maintaining genetic biodiversity in their respective management areas. The local government, however, can strengthen national efforts in monitoring the trends of cultivated plants and farmed animals and their wild relatives as potential sources of genetic materials within their area of jurisdiction, especially those local governments that host large nature reserve areas (e.g., Shima City of Japan). While MPAs and other natural reserves have been incorporated into the ICM programme of the local government, efforts are still needed to strengthen not only their management but also the preservation and monitoring of the genetic resources therein.

In the last several years, some local governments have initiated admirable efforts to conserve biodiversity. This is done through maintaining the City Biodiversity Index, also known as the Singapore Biodiversity Index, although this is still at the experimental stage (Rodricks, 2010; Chan, et al. 2010). Such local government efforts not only contribute to achieving this target but also present a performance index of local governments in preserving and maintaining biodiversity. In fact, ICM can integrate the City Biodiversity Index as one of the performance criteria in achieving sustainable development.

Integrating Aichi Biodiversity Targets 14 to 20 into the ICM mainstreaming and reporting system

d) **Strategic Goal D** is aimed at enhancing the benefits to all from biodiversity and ecosystem services through the achievement of Targets 14 to 16 by protecting the functional integrity of ecosystems, benefiting from their goods and services, strengthening their resilience to change, and ensuring that the Nagoya Protocol is fully operational. These goals could be achieved through the scaling-up of ICM practices and reinforcing them through national policy and legislation.

Target 14

Safeguarding the sustainable delivery of quality ecosystem goods and services is an important function of ICM by means of ensuring the supply of basic human requirements in terms of air, water and food as well as other services that enhance human life in the planet. More than 90 per cent of the oxygen found in air is derived from the ocean, whilst almost 100 per cent of freshwater is taken from the limited

freshwater resources on land, with a small proportion obtained from desalination. Almost all the food needed to support the world's population is derived from the living resources from both land and seas. Management efforts such as ICM are directed towards sustaining such basic but immense benefits from ecosystem services to humankind but strong public support is essential for effective management, policy and practices to be in place in order to safeguard these ecosystem services. Also, urgent management interventions are needed to address the unequal distribution of the benefits of ecosystem services that have resulted in the vast disparity between the rich (who have greater access to the ecosystem services) – and the poor – (who are hardly able to benefit from the gifts of nature). Thus, social equity is an important sustainable development principle, which, in turn, is also the guiding principle of ICM practices. In the process of implementing ICM programmes, the needs of all stakeholders should be carefully assessed, particularly giving preferential attention to indigenous peoples and local communities, the disenfranchised poor and the vulnerable sectors.

Target 15

One major outcome of the ICM programme is not only to protect ecosystems and biodiversity but also to restore damaged habitats and ecosystems through its rehabilitation action plans, which seek to reestablish the major functions and resiliency of the ecosystems in question. Some examples of habitat restoration initiatives include reforestation of wetlands, cleaning up and restoration of the functions of polluted bays and ecological resilience enhancement of cleaned-up areas. Because it is impossible or unrealistic to expect full restoration of damaged habitats to their original conditions, the best option for coastal managers is to prevent habitat destruction in the first place.

Target 16

This target can only be reached when the national government has set the necessary policy instrument that mandates the development and implementation of NBSAPs in fulfilment of their international commitments. Nevertheless, any successes by local governments in achieving most of the aforementioned Aichi Targets at the local level will serve as strong showcases to increase national commitments. Thus, ICM can contribute to the implementation of the Nagoya Protocol at the local level.

e) **Strategic Goal E** is aimed at enhancing implementation of Aichi Targets 17 to 20 by strengthening participatory planning, knowledge management and capacity development.

Target 17

The Aichi Biodiversity Targets can only be achieved at the national level if each country has prepared, adopted and implemented its NBSAP. NBSAPs can build upon the successes or learn from the shortcomings of the biodiversity-focused ICM programmes to design national plans of action as well as to build the necessary governance and management capacity at national and local levels for implementation of the Strategic Plan for Biodiversity.

Target 18

Traditional knowledge is highly valued in ICM programme development and implementation as special attention and efforts are made to incorporate traditional knowledge in coastal and marine area management. Indigenous people living in watersheds and upstream of river systems and those living along river mouths and adjacent coasts understand and even venerate the close ecological linkage and interdependence between the forest and the sea. Some remaining traditional practices are still being applied in some countries, such as the *sato umi*[5] and *sato yama* programmes in Japan. ICM encourages further enhancement of traditional practices and their incorporation into the development of action plans for coastal

5 http://www.cbd.int/doc/publications/cbd-ts-61-en.pdf

and marine area management. As existing traditional practices occur at local areas, traditional knowledge tends to be confined to the specific areas. Local ICM, therefore, presents a good vehicle for documentation, enhancement and use of traditional knowledge and practices for application in other areas.

Target 19

The implementation of the Strategic Plan for Biodiversity is expected to lead to improved knowledge in the application of science and technology to the development of action-specific activities. Such knowledge, experience and methodologies arising from the implementation of biodiversity-focused ICM programmes could be shared and applied throughout the nation. Of particular importance in biodiversity-focused ICM initiatives is putting together the necessary pool of biodiversity management–related knowledge, experiences and demonstrations that could be shared with other local authorities, as well as the development of a critical mass of local expertise and institutional capacity to support national scaling-up of ICM practices.

Target 20

Financial resources from all sources will be increased as the biodiversity-focused ICM initiatives create the much-needed policy and financing investment environment. The ICM approach has effectively catalyzed financial investments from both the public and private sector (UNDP–GEF, 2012). Effective management of various ICM programme activities are expected to increase cost efficiency from the reduction of multiple use conflicts, duplication of responsibilities among government agencies, policy and market failures and management capacity deficiency.

It is apparent from the analysis above that ICM can contribute to achieving the 20 Aichi Biodiversity Targets, either directly meeting the set targets at the local level or indirectly influencing or catalyzing national actions to achieve those requiring national policy, legislations and national management interventions. It is therefore evident that it is more – if not most – cost-effective to incorporate relevant CBD targets into integral parts of the ICM programmes. Table 4.1 provides a summary of the application of ICM in achieving the Aichi Targets.

Table 4.1. Application of ICM component elements to the achievement of the Aichi Biodiversity Targets.

Aichi Biodiversity Targets		Application of ICM Measures
Theme	Target	A basic requirement for ICM application is to implement all components of the ICM system for achieving a single or a combination of the Aichi Targets at subnational scale. To achieve national biodiversity targets, scaling-up and mainstreaming of ICM into national economic and environmental agenda is essential. The component on "habitat protection, management and restoration" could be modified or expanded as a "biodiversity component" to allow inclusion of other biodiversity concerns. Key strategic pointers for instituting ICM measures relevant for addressing specific Aichi Targets are listed below.––
1. Awareness increased	People are aware of the values of biodiversity and the steps they can take to conserve and use it.	a) Explain the value of biodiversity in communication plans to reach out to policymakers and stakeholders and the public in general; and b) Include stakeholder involvement and participation in the planning and implementation process.
2. Biodiversity values integrated	Biodiversity values have been integrated into national and local development and poverty eradication strategies and planning processes, and are being incorporated into national accounting, as appropriate, and reporting.	a) Widen the scope of "Habitat Protection, Restoration and Management" to incorporate other prioritized biodiversity issues in designing response actions; b) Integrate knowledge on ecosystem services in ICM educational programmes; c) Link poverty eradication in the use of appropriate ecosystem services; and d) Effectively utilize the "state of the coasts" format for reporting of outcomes.

Aichi Biodiversity Targets		Application of ICM Measures
3. Incentives reformed	Incentives, including subsidies harmful to biodiversity, are eliminated, phased out or reformed to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with conventions and other relevant international obligations, taking into account national social and economic conditions.	a) Subsidies that are harmful to biodiversity, including certain subsidies for fisheries, fertilizers for agriculture, or other incentives, should be addressed at the national policy level; b) The harmful effect of such incentives should be made clear at the local level in ICM planning and management consideration; and c) Incorporate information on these matters into education and communication plans to raise public awareness.
4. Sustainable consumption and production	Governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumptions and have kept the impacts of use of natural resources well within safe ecological limits.	a) Promote sustainable consumption and production through public awareness campaigns, education and training activities and incorporate them into ICM programmes; b) Strengthen sustainable fishery management in designing response actions related to "food security and livelihood" under the ICM programme framework by promoting the ecosystem approach in fishing and aquaculture activities; c) Change human consumption behaviour by increasing knowledge and awareness of the harmful effects of certain behaviours on endangered species; and d) solicit business sector support by strengthening corporate social responsibility.
5. Habitat loss halved or reduced	The rate of loss of natural habitats, including forests, is at least halved or where possible brought to close to zero, and degradation and fragmentation are significantly reduced.	a) Policy and management measures should be in place to stop or reduce further loss of natural habitats; b) The root causes of habitat loss should be clearly understood and strategic management actions taken to address them; and c) Initiate habitat restoration programmes to revive damaged habitats or restore their functions.
6. Sustainable management of marine living resources	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based management approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems, and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits	a) Strengthen the component of the ICM programme on "food security and livelihoods" to promote management measures towards sustainable fisheries and aquaculture through the ecosystem approach, reduce overfishing, ensure fishing within maximum sustainable yield; b) Implement stock recovery programme where applicable; c) Implement other components of the ICM programme (e.g., habitat protection, pollution reduction); and d) Increase effectiveness by scaling-up ICM practices.
7. Sustainable forestry, agriculture and aquaculture	Areas under forestry, agriculture and aquaculture are managed sustainably ensuring conservation of biodiversity.	a) Address human activities in forestry, agriculture and aquaculture that affect the ecological linkages between upland watersheds and coastal seas especially the ecological impacts of forestry, agriculture and aquaculture on the functional integrity of inland, estuary and coastal ecosystems; b) Identify and implement the types and levels of conservation measures to conserve biodiversity within the area of responsibility; and c) Identify and implement measures to reduce the mutual impacts of forestry, agriculture and aquaculture including subsidies.
8. Pollution reduced	Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	a) Undertake comprehensive management measures to reduce pollution from land and sea by preventing or reducing domestic and industrial wastes and ship discharges; and b) Maintain regular water quality monitoring and keep the level of pollutants within ecologically accepted limits.
9. Invasive alien species prevented and controlled	Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	a) Identify the occurrence of invasive alien species and source of introduction in area of responsibility; b) Assess ecological and human health risks associated with the invasive alien species; c) Undertake legislative and management measures to control or eradicate them; and d) With support from concerned central line agency, implement legislative measure to prevent their further introduction and establishment in the country.
10. Pressures on vulnerable ecosystems reduced	The multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized to maintain their integrity and functioning	a) Strengthen the component on disaster prevention and management of the ICM system by developing and implementing climate change adaption measures to specially mitigate pressures (such as land reclamation and ocean acidification) impacting key vulnerable ecosystems, such as coral reefs, mangroves, sea-grass beds; and b) Maintain regular monitoring of the health of vulnerable ecosystems within area of responsibility.

Aichi Biodiversity Targets		Application of ICM Measures
11. Protected areas increased or improved	At least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based management conservation measures, and integrated into the wider landscape and seascape.	a) Widen the component of the ICM system on “Habitat Protection, Management and Restoration” with special focus on increasing the number/area coverage of protected areas in inland water areas and the coastal and marine areas within area of responsibility to meet the desired targets; and b) Strengthen management measures to ensure effectiveness in conserving biodiversity and the sustainable use of the ecosystem services derived.
12. Extinction prevented	The extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	a) Widen the scope of the component of the ICM system on “Habitat protection, Management and Restoration” by including the identification for endangered species in the area of responsibility and assess the current and potential risk of extinction; and b) Initiate measures for the protection of endangered species through legislative measures, public campaigns and regular monitoring and reporting of status.
13. Genetic diversity maintained	The genetic biodiversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	a) Include protection of genetic biodiversity as a focused biodiversity conservation activity of the expanded component on “Habitat Prevention, Management and Restoration" of the ICM system with special focus on identifying species of genetic importance in the area of responsibility; b) Where possible, apply national policy and directives or guidelines on the preservation of genetic biodiversity of cultivated plants and domesticated animals, as well as those of socio-economic and cultural significance; and c) Organize scientific team to provide technical guidance for policy and management interventions.
14. Ecosystems and essential services safeguarded	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihood, and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	a) Follow the processes in the development and implementation of the ICM program with expanded focus on various biodiversity concerns; b) Ensure continuity of the ICM efforts by following the ICM cycle of practices to reap and sustain the full benefits of the ecosystem services; and c) Evaluate the effectiveness of the ICM efforts based on performance criteria and results indicators including those that relate to attaining the Millennium Development Goals, Agenda 21 and NBSAPs produced by Parties to the CBD.
15. Ecosystems restored and resilience enhanced	Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	a) Strengthen the component of the ICM system on ""Habitat Protection, Management and Restoration" by protecting pristine habitats, increasing conservation areas and restoring damaged habitats within the area of responsibility; b) Develop and implement effective management measures to restore ecosystem functions; and c) Continue implementation of the ICM programmes to enhance ecosystem resilience in light of climate change, increased development impacts and rate of biodiversity loss.
16. Nagoya Protocol in force and operational	The Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization is in force, operational and consistent with national legislation.	a) Implement the Nagoya Protocol within the area of responsibility by implementing the ICM programme with special focus on achieving the Aichi targets; b) Contribute to national biodiversity efforts through sharing of information and practical integrated management efforts at subnational level; and c) Increase effectiveness through scaling-up and mainstreaming of ICM.
17. NBSAPs adopted as policy instrument	Each party has developed, adopted as a policy instrument and commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	a) Integrate biodiversity conservation, in particular the Aichi Targets, into national ICM strategy and action plans as the detailed action plans of the NBSAPs; and b) Institute legislative or policy instruments for the implementation of the NBSAPs at national and local levels.
18. Traditional knowledge respected	The traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological sources, are respected, subject to national legislation and relevant international obligation, and fully integrated and reflected in the implementation of the convention with the full and active participation of indigenous and local communities, at all relevant levels.	a) Include the participation or involvement of indigenous peoples and local communities in the process of ICM programme development and implementation within area of responsibility to fully capture their knowledge, innovations and practices relevant to conservation and sustainable use of biodiversity and their customary use of biological resources; and b) Where appropriate integrate traditional knowledge into the science-based ICM programme.

Aichi Biodiversity Targets		Application of ICM Measures
19. Knowledge improved, shared and applied	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	a) Strengthen knowledge management on ICM practices through periodic review and synthesis of acquired information and knowledge; and b) Document and disseminate for wider application by other ICM practitioners.
20. Financial resources from all sources increased	The mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources and in accordance with the consolidated and agreed process in the strategy for resource mobilization should increase substantially from current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	a) Utilize the broad ICM framework and the efficient processes and dynamics of the ICM system to catalyze financial resources from the governments, corporate entities, bilateral and multilateral lending institutions and bilateral or multilateral aid programmes to support environmental and biodiversity conservation projects; b) Strengthen the involvement of the business communities and multilateral banking institutions to co-finance environmental improvement projects; and c) Mobilize national and subnational resources by scaling-up and mainstreaming.

Source: UNEP/CBD/COP/DEC/X/2

4.3 INITIATING, DEVELOPING AND IMPLEMENTING BIODIVERSITY-FOCUSED ICM PROGRAMMES FOR ACHIEVING AICHI BIODIVERSITY TARGETS 1 TO 13

It is obvious from the previous items that the ICM system could serve as a useful working model for achieving the biodiversity strategic goals and targets. As these goals and targets are complementary to the overall sustainable development goals of the ICM programme, it is only appropriate, for reasons mentioned in the earlier sections, to incorporate specific CBD goals as achievable targets of all ICM programmes guided by the performance indicators provided in Table 4.1. In areas where biodiversity loss has severely affected the sustainable delivery of ecosystem services, management efforts should be intensified with emphasis on developing a biodiversity-focused ICM programme. The key steps below could be followed to guide the establishment and implementation of such a programme.

Assess the suitability of potential sites

Existing ICM programmes of local governments may be strengthened further to incorporate Aichi Targets in their overall goals and specific objectives if current ICM programme efforts are inadequate to achieve the CBD Strategic Plan and Targets. Existing ICM sites have already established the necessary policy and management framework that could easily incorporate biodiversity-related activities.

For other potential sites, their suitability must be evaluated to ensure the feasibility of establishing and implementing biodiversity-focused ICM programmes. A feasibility study is undertaken at a potential site aimed to identify support and resistance from political leaders, business sectors, as well as all other concerned stakeholders. In addition, it will ascertain availability of appropriate human and financial resources, elucidate institutional structure, and identify the types and level of interagency conflicts. Most often this type of assessment is done through the rapid appraisal (RA) process (refer to Section 2). Based on the RA report, an experienced coastal management practitioner can evaluate whether conditions are favourable for launching such programmes. Favourable conditions include the following:

a) Strong interest of local government and willingness to commit human and financial resources (within their capacity);

b) General support from stakeholders, including indigenous peoples and local communities;

c) Clearly identified environmental and sustainable development issues that could be addressed

through the ICM approach, especially in achieving specific Aichi Targets;

d) Availability of relevant line agency willing to serve as leading coordinating agency; and

e) Programme is in line with national policy and meets obligations of international conventions.

On the other hand, such a programme should not be initiated or should be delayed intentionally if the local conditions are not favourable. Such conditions include the following:

a) Unwillingness of local government to commit their own resources (even if the amount is affordable and within their current budget and available human resources);

b) Strong political or key stakeholder resistance that may take too much time and resources to convince them to change their positions;

c) Relevant agency not willing to serve as the coordinating lead agency; and

d) National government refuses to support the initiative.

Local government approval (even partially) of the concept and willingness to invest in human and financial resources is in fact a prerequisite.

Identify availability of funds and establish budget requirements

Although the availability of funds is instrumental for establishing and implementing a good quality programme, it is not the absolute limiting factor. If the aforementioned favourable conditions are present, the needed funds can be raised; ICM, after all, normally facilitates the development of policy and financial investment environments that are conducive for sourcing financial resources.

A small amount of funding (approximately US$ 50,000 in developing countries) is needed for assessing the suitability of a site for the establishment of a biodiversity-focused ICM programme. Subsequent funding will be required to establish a project office with staffing (approximately US$ 56,000 - 92,000 annually), and then for the development, coordination and approval of the programme (approximately US$ 100,000 a year for three years).[6] The biggest financial requirement is for the implementation of the various strategies and activities identified in the Strategic Plan for Biodiversity. The needed funds depend on the types, level and scale of activities. This will be estimated as the programme activities develop.

At the onset, the ICM programme should be developed in collaboration with concerned line agencies as some of the proposed activities fall within the functions of specialized agencies such as Fisheries (fisheries and aquaculture), Transport (oil spills, invasive alien species, shipping traffic), Agriculture (deforestation, fertilizer subsidies), Environment (disasters, biodiversity loss, land-based pollution), Planning (land use), Ocean (sea use), Tourism (coastal tourism), and Port Authority (harbour and ports), among others. Through the process of joint planning and coordination, the responsibility for implementation should lie with the concerned agency. As such, the needed budget should be built into the annual budget of the concerned agency for their implementation.

Other sources of funding could be tapped through innovative financing mechanisms, such as public-private partnerships for financing environmental improvement infrastructure, which requires substantial investment, sewage treatment facilities or sanitary landfills, to name a few. There is increasing financial support available through the business community to improve environment quality, reduce biodiversity loss and set up MPAs as part of their corporate social responsibility. The United Nations, international organizations, multilateral financial institutions and several national aid agencies have also been contributing to environmental improvements and sustainable development. Their resources could be more effectively utilized/mobilized for the purposes stated above.

6 These figures are general estimates; actual amounts required for these steps will depend on a number of factors.

Establish an ICM Coordinating Committee

Because of the governance and management complexities involving various line agencies, it is necessary to establish an ICM coordinating committee to serve as the mechanism for high-level decision-making in the development and implementation of the biodiversity-focused ICM programme. The committee is expected to undertake the following functions:

a) Provide policy guidance throughout the whole process of programme development and implementation;

b) Approve work plan, budget and progress reports prepared by the project office;

c) Coordinate with concerned agencies and sectors to avoid duplication, conflicts of interests and improve cooperation and collaboration in developing and implementing project activities; and

d) Review and approve periodic performance reports and state of the coasts reports.

As this is a working committee, regular meetings should be scheduled at least twice a year to fulfill the functions.

The composition of the committee includes heads or representatives of concerned line agencies and representatives from business communities, scientific and education institutions, concerned non-governmental organization and coastal communities. For ICM sites smaller than a province, a representative from the provincial or national government sitting in the committee will prove to be advantageous when securing provincial or national government support. Where international aid agencies have made contributions, a representative from the concerned agency would certainly be an advantage. The leadership of the committee is also an important consideration. In most instances, the head of the local government should be the chair of the committee. This will strengthen the leadership role of the committee in addressing administrative, financing and other operational challenges.

Establish a project team and project office

The success and failure of an ICM programme very much depends on the capability and commitment of the project team and the quality of its leaders. Hence, time and effort should be invested in setting up an efficient project office composed mainly of a small interdisciplinary team of local staff and a project leader. The project office is to undertake the following functions:

a) Serve as the secretariat in executing the decisions and directions of the coordinating committee;

b) Drive, initiate and facilitate the formulation and implementation of the ICM programme following the procedures and processes of the ICM system;

c) Serve as the focal point for monitoring the progress of activities throughout programme formulation and implementation;

d) Present programme outputs and outcomes to the coordinating committee and final release of the state of the coast reports; and

e) Prepare the site to move on to the next phase of the ICM cycle.

Candidates for the project team should be carefully selected; it is indeed a difficult task. An ideal team is one equipped with interpersonal skills, sound knowledge in sustainable development, broad-based training in marine affairs or coastal management and working experience in public administration at the sub-national level. For an ICM programme focused on the Aichi Targets, the team should consist of members who are knowledgeable about the Convention on Biological Diversity and various other international biodiversity-related conventions and protocols. Specialized skills are needed throughout the process of programme development, and they could be sourced either from specialized agencies or research institutions. Local officials with working experience in public administration, economic planning, environmental management or those who have undergone specialized training in coastal management, marine affairs, ecosystem management and marine spatial planning are

the preferred candidates. The project leader should be a senior person with good local administrative experience, with broad-based training in sustainable management and strong interpersonal skills, and should be capable of facilitating, promoting, moderating and driving project development within the allocated time frame.

The project office is preferably hosted by a relevant leading line agency or placed under the direct supervision of the head of the local government or his/her designated representative. The environmental or conservation agency is the obvious choice for the role of lead agency, considering the nature of the work, particularly the focus on biodiversity conservation.

Integrate relevant Aichi Biodiversity Targets into the policy, strategies and action plans

Unlike the standard ICM programme that addresses various sustainable development challenges, the biodiversity-focused ICM programme places greater emphasis on achieving the biodiversity targets in areas where biodiversity conservation, protection of ecosystem structure and functions as well as sustainable use of ecosystem services have been prioritized. As such, the appropriate Aichi Targets should be integrated into the ICM programme and its scaling-up. In facilitating the integration of the targets into the ICM programme, additional efforts could enhance the development of the biodiversity-focused ICM programme by doing the following:

a) *Enriching local vision and mission on sustainable coastal and marine development to include the vision and mission of the Strategic Plan for Biodiversity 2011-2020*
The enriched common vision and mission are expected to motivate interagency efforts and stakeholder participation in the development of the biodiversity-focused ICM programme; moreover, it will enable the integration of Aichi Targets into their work plan and budget. The vision statement for each site may vary according to the local conditions, although overall programme direction and targets are more or less similar.

b) *Integrating relevant specific Aichi Targets into ICM processes of information gathering, analysis, use, storage and management*
During the ICM programme initiation and development phases, efforts should be made to gather, analyze and use information pertaining to the types of ecosystems, the level of usage, delivery and value of ecosystem services as well as factors threatening ecosystem functioning and sustainable management challenges. The analysis will include identification of underlying causes, including those of cultural, political, financial, socioeconomic and human resources barriers.

The processes mentioned will determine the level of biodiversity challenges and justify the development and implementation of policy reforms and management measures to prevent or reduce the aforementioned barriers. By gathering information for the preparation of coastal strategies or state of the coasts reports, much of the biodiversity information will be gathered along with information on other areas of concern. Initial and final risk assessments will be undertaken to determine the types, level and severity of risks to human and ecosystem health, lives and properties. Through this process, priority areas requiring immediate or subsequent management interventions will be identified and agreed upon by stakeholders through a series of stakeholder consultation workshops. Appropriate strategies and management actions will then be prepared, prioritized and integrated into the overall strategic action programmes. Biodiversity concerns should form a major part of the analysis to justify the incorporation of Aichi Targets into the strategic action programmes.

c) *Understanding the ecological linkage between terrestrial and marine ecosystems*
The linkage between terrestrial and marine ecosystems is traditionally known. For example, litter from the forest serves as a fertilizer for algal growth in the lower reaches of rivers and estuaries while migratory fish such as trout

are known to migrate from the sea, moving upstream to spawn and die there, subsequently serving as food for a large number of predatory animals on land. ICM practitioners need to understand these ecological linkages in the process of land- and sea-use planning so that these important ecological functions are carefully protected.

d) *Raising public knowledge and awareness of ecosystem services and benefits to generate sustained public support*
In most developing countries, the general public and even government officials at the local levels are not fully aware of the interconnectivity between the ecosystems and their daily lives. Consequently, biodiversity loss and degraded ecosystem functions have often been ignored or given low priority in the government economic agenda. Efforts to change public perception with regard to the preservation of the functional integrity of the ecosystem, reduction of biodiversity loss, and promotion of biodiversity conservation need to be intensified to create a bigger group of informed public that translates into public support.

e) *Addressing coastal and marine biodiversity issues in a holistic manner*
Effective application of the frameworks, approaches, mechanisms, and processes of the ICM system and its scaling-up is expected to achieve sustainable management of the marine living resources (Target 6), reduction of pressures on vulnerable ecosystems such as mangroves, coral reefs and sea-grass beds (Target 10) and increased number of adequately managed protected areas and restoration of degraded habitats (Target 11). These targets have already been included as part of existing ICM programmes.

f) *Strengthening science-based integrated management is a continuous effort to improve the effectiveness of ICM*
Marine protected area management (Target 11), habitat restoration (Target 14), and sustainable harvesting (Target 6) require sound scientific support to justify policy, management and technological interventions. The lack or inaccessibility of scientific information is a common challenge to effective resource management at the local level. As a result, ICM practitioners need to access updated information through the help of research institutions and expertise within their reach.

g) *Increasing technical and management capabilities in biodiversity conservation and sustainable use at local level*
While existing ICM efforts implemented thus far have developed a pool of technical and management capabilities at the local and national levels, the human resource requirements for achieving the Aichi Targets will require much more individual and institutional capacities throughout a country. As such, capacity development should be a continuous process and mainstreamed into national capacity development agendas, especially those related to achieving the Aichi Targets.

h) *Making full use of regular reporting to keep the stakeholders informed of the state of health of their ecosystem*
Reporting (including through the use of clear performance indicators) could be effectively used to inform the public of the existing situation, the improvements made, as well as the pending actions. Through this type of reporting, public opinion could be galvanized toward supporting policy and management interventions to effectively curb biodiversity loss and achieve the Aichi Targets.

Follow the process of the ICM cycle

The steps in the ICM cycle presented in Section 2 should be followed to develop the biodiversity-focused ICM programme. The specific activities outlined in each of the sequential steps, namely preparing, initiating, developing, adopting and

implementing the programme, as well as the follow-on steps in monitoring and reporting its performance and impacts, remain essentially the same. Extra efforts might be necessary during each step to effectively utilize the dynamics in each stage of the process and drive the development of the biodiversity-focused programme; these are elaborated below:

a) *Preparing*

At this early stage, special workshops should be organized to prepare and familiarize project personnel, concerned local officials, and other potential collaborators on the concept and general practices of ICM and the needs and justification for focusing on biodiversity issues to reinforce their convictions regarding the project objectives and focuses.

b) *Initiating*

While information gathering and analysis remain the key activities towards identifying environmental and management challenges in achieving sustainable development, ample efforts will also be focused on gathering detailed biodiversity information to assess the rate of biodiversity loss, the underlying causes to such, the implication of this to ecosystem functions and delivery of goods and services, and the subsequent prioritization for management actions. Outputs of analysis should be disseminated to the stakeholders and the general public to ensure their understanding and acceptance.

c) *Developing*

A common vision among stakeholders will take shape during this stage after reviewing the analyzed information from coastal profiling, risk assessments and special studies. The importance of biodiversity values and ecosystem services must be highlighted and incorporated into the vision statement. As the intention is to develop a biodiversity-focused ICM programme, special attention should be directed towards developing action plans that will focus on addressing specific biodiversity issues in achieving the relevant Aichi Targets within the overall ICM framework. Biodiversity issues that are not identified as top priority may be reconsidered and addressed in the subsequent cycle. In developing the programme of action, it is essential to ensure a holistic but strategic approach with particular emphasis on addressing the underlying causes.

d) *Adopting*

This stage will be smooth sailing if the local government takes the driver's seat and the process of ICM development is strictly followed. As concerned agencies and key stakeholders were involved in the development of the common vision and the subsequent specific action plans that received the approval of the interagency committee, the types and level of resistance to the adoption of the final programme or accompanying legislation or ordinances will be greatly reduced. A biodiversity-focused ICM needs strong justification so that the action plans will be seen as not only a conservation plan, but also as serving the socio-economic needs of local communities.

e) *Implementing*

The programme of action is best implemented through respective line agencies to achieve the intended results. In this case, environmental and conservation agencies will have to play a greater role with support from other agencies in addressing related issues. This is a very challenging phase of the programme as it entails the sharing of responsibilities and, hence, the use of human and financial resources.

f) *Monitoring, evaluating and reporting*

Rigorous monitoring of progress and evaluation of performance generally follow a standard procedure. For example, the state of the coasts reporting format presents a versatile and comprehensive approach to identifying performance targets (PEMSEA, 2011). The Aichi Targets should be integrated into the performance indicators so that they can be monitored and measured throughout the course of implementation.

g) *Consolidating and refining*

Lessons learned from the first ICM cycle will definitely contribute to the consolidation of approaches and methodologies; furthermore, they will provide the take-off point for refinement. Other identified issues or Aichi Targets could then be included in the second ICM cycle and a new phase of biodiversity-focused ICM programme will then be prepared.

Prepare and release report

Relevant Aichi Targets should be integrated into the performance indicators, and trends analysis will be conducted to identify the level of achievement according to the performance criteria. The state of the coasts reporting by PEMSEA is one format that could be used in preparing this report (PEMSEA, 2011)

4.4 SCALING-UP ICM PRACTICES

One effective way of achieving the Aichi Biodiversity Targets, especially those targets related directly to marine and coastal and biodiversity, is by scaling-up biodiversity-focused ICM programmes throughout national coastlines and watersheds. Given that there are jurisdictional boundaries involved, this is a formidable task.Certain basic conditions must be present to effect scaling-up of ICM practices, including, among others, the availability of tested ICM working models, the much-needed managerial and technical capability for integrated planning and management, public awareness and public support for biodiversity conservation and protection of ecosystems and habitats.

The Aichi Targets could be achieved at the national level through geographical and functional scaling-up of biodiversity-focused ICM practices. This is done by expanding the geographical coverage of ICM practices. Initially, a few sites should be developed to demonstrate the feasibility and variability of the ICM practices in achieving the Aichi Targets at the local level. Building upon a critical mass of ICM sites and learning from new experiences, ICM initiators could promote replication of the biodiversity-focused ICM practices and their multiplication throughout the country. Such an approach has certain limitations, however, as transboundary biodiversity issues across jurisdictional borders — for example, impacts of upstream discharge on the downstream ecosystems — would not be effectively addressed. With the experience of ICM practices, concerned local governments could cooperate with concerned local authorities to expand their ICM operating boundary to include cross-boundary biodiversity and other related environmental issues within the geographical scope of the ecosystem boundary.

Local governments tend to learn from and compete with each other. A successful biodiversity-focused ICM practice will certainly attract replication, along with the necessary modifications to suit local conditions. As there is much to learn from each other, a national or sub-regional network or association of local governments practicing ICM could be established within the countries to build capacities, promote its practices and expansion, share information and experiences and standardize methodologies and approaches in meeting international standards.

At the national level, pertinent national legislation and strategies could be developed to provide the much-needed enabling environment for local governments to embark on ICM practices in meeting the Aichi Targets. The national strategies would prioritize strengthening of public awareness, use of traditional knowledge, application of science, adaptive management and precautionary principles as well as development of local capacity to plan and manage their local biodiversity resources in a holistic and sustainable manner. As countries update their NBSAPS, these updated versions could include local implementation of the plan through ICM practices, which would certainly contribute to the realization of the biodiversity goals of the NBSAPs.

5. MAINSTREAMING THE AICHI BIODIVERSITY TARGETS INTO LOCAL, NATIONAL AND REGIONAL IMPLEMENTATION OF MARINE AND COASTAL MANAGEMENT PROGRAMMES

The purpose of this section is to present possible approaches to mainstreaming the Aichi Biodiversity Targets into local, national, sub-regional and regional implementation of marine and coastal management programmes. It highlights the importance of developing the much needed enabling environments to promote biodiversity-focused ICM programmes, their geographical expansion and functional scaling-up to achieve the CBD Strategic Plan. This section provides two examples of working models from the East Asian Region pertaining to geographical expansion of ICM practices and functional scaling-up to cover transboundary management of larger bays, gulfs and large marine ecosystems (LMEs) as well as watersheds and riverine systems, highlighting the roles of national governments in providing the needed enabling policy especially in terms of technical and capacity development support. This section also justifies the necessity to incorporate the Aichi Targets into coastal and marine management programmes at sub-national, national, sub-regional and regional levels. It suggests integrating the NBSAPs into the broader national marine and coastal management strategies and action programmes that are already in place, including those of the ICM. This section also highlights PEMSEA's effort in implementing the Sustainable Development Strategy for the Seas of East Asia (SDS–SEA) as an example of a means to incorporate the five goals of the CBD Strategic Plan and and its 20 Aichi Targets into regional cooperation in addressing sustainable development challenges, including biodiversity issues.

5.1 INTRODUCTION

The CBD's global objective of achieving the Aichi Biodiversity Targets depends on the commitments and effectiveness of actions taken by each country. Nevertheless, much can be done at the sub-national level to achieve most, if not all, of the Aichi Targets if they can be incorporated into current and future marine and coastal natural resource management programmes, especially those that implement ecosystem-based management, integrated water resource management, and integrated coastal and marine area management.

For those countries that have implemented integrated coastal management programmes, it will be comparatively easy for the concerned local governments to incorporate the relevant Aichi Biodiversity Targets into the appropriate action plans of their ICM programmes. Once the benefits of biodiversity-focused ICM practices become visible, it will be a question of time before Aichi Targets will be naturally and systematically mainstreamed into the biodiversity component of the ICM programmes. The success of one local site can be a showcase for other local governments to replicate. That much can be done at the local level. However, the process of national adoption of ICM practices may take considerable time and effort. Multiplying the efforts of local government initiatives alone may not achieve the national Aichi Targets within the envisioned time frame.

The national government has to play a key role in achieving the Aichi Targets by implementing the necessary ICM scaling-up policy and technical support as well as providing the appropriate incentives for local governments to implement biodiversity-focused ICM programmes and their extension across jurisdictional boundaries. NGOs or international aid programmes can help accelerate the process but the responsibility still lies with the national government as it involves national policy, legislation, financing and human resources.

5.2 CREATING AN ENABLING ENVIRONMENT FOR MAINSTREAMING AND SCALING-UP BIODIVERSITY-FOCUSED ICM PROGRAMMES

A national marine and coastal policy is generally established not only for national security reasons but also for protecting lives and property, and ensuring harmonious and sustainable use of marine and coastal areas, including marine space, the seabed as well as the natural resources within national jurisdictions. A guiding national policy is a common vision reflecting the collective goals and aspirations of the stakeholders/citizens on how the coasts, islands, seas and oceans under national jurisdiction could be best utilized to benefit current and future generations of the country.

Australia, Canada, Indonesia, Japan, Republic of Korea, and the United States of America have already established ocean policies, while many other countries have sector-based fragmented policies related to coastal and ocean governance. Specific marine and coastal legislation has also been established, such as the Coastal Zone Management Act of the USA (1972), the Coastal Management Act of Republic of Korea (1999 amended 2009), and the Marine Space Utilization Law of the People's Republic of China (1997). In the Philippines, the National Strategy for Coastal and Marine Management is promoted through a presidential decree, while in Vietnam, 14 coastal provinces have been earmarked to implement ICM programmes through a directive from the Office of the Prime Minister.

The ICM sustainable development framework encompasses several key international conventions and international agreements such as UNCED (Agenda 21), GPA (Land-based pollution), Convention on Biological Diversity (Aichi Biodiversity Targets), MARPOL (marine pollution from ships) and Climate Change (disaster management, sea-level rise) in addition to several other IMO/UNEP conventions on alien species, marine litter, and other matters. The integrated approach of ICM practices allows several relevant international instruments to be addressed within a single area-based ICM framework. Thus, the implementation of the Strategic Plan for Biodiversity could be expedited by mainstreaming the plan into the inland, coastal and marine area management system.

The problem of inadequate managerial and technical capacity to undertake science-based integrated planning and management of marine and coastal areas, especially at the local level, makes it difficult to expand ICM efforts. A systematic approach to building this capacity is a matter of urgency. This may be an area where a structured training programme throughout the globe to build local and national managerial and technical capacities is much needed in achieving the Aichi Biodiversity Targets.

Another common challenge is how to secure the necessary financial resources to fund biodiversity projects and programmes or ICM as a whole. This practical issue should be addressed upfront. For example, ICM practices in the East Asian Seas region have repeatedly demonstrated that necessary financial resources can be raised within the ICM framework through activities at the local level, although availability of seed funds from the national government or from international or bilateral aid agencies would definitely help. The challenge is how to make the local stakeholders, including the business sector, appreciate the benefits from the implementation of biodiversity-focused ICM programmes.

Local ownership is crucial. This is normally realized through close interagency cooperation and stakeholders' participation under a shared vision on the use of ecosystem services. The shared vision is expected to galvanize common aspirations and desire for change. This will make it easier for interagency consultation to incorporate the necessary budgetary requirements. The business community, which can obviously benefit from these actions, might be willing to shoulder a portion of the costs as part of their corporate social responsibility. Adequate public awareness needs to be created through regular consultations and an effective communications plan in order to facilitate a shift in conventional perceptions and change in the mode of operation among local government agencies and stakeholders.

Escalating the local vision into a national vision should enhance collaborative efforts in addressing sustainable development challenges. A national strategy for ICM development and implementation will certainly enhance efforts to incorporate, mainstream and implement the Strategic Plan for Biodiversity.

5.3 MOVING TOWARD GEOGRAPHICAL AND FUNCTIONAL SCALING-UP TO ACHIEVE THE AICHI BIODIVERSITY TARGETS

For the purpose of geographical expansion, strategic efforts are needed to prepare local conditions for scaling-up biodiversity-focused ICM practices.

One model for scaling-up is through replication of ICM practices in different coastal sites throughout the country. This has to be done gradually if a critical mass of local expertise is not yet available. A gradual process of increasing the number of sites practicing ICM will yield more effective results than having a large number of sites practicing ill-developed ICM programmes. National efforts are necessary to develop a critical mass of local government practicing biodiversity-focused ICM programmes. In the East Asian Seas region, for example, the countries set a target of 20 per cent of coastlines to be covered by ICM practices by 2015. Such critical mass of ICM sites is expected to catalyze other local governments to replicate the ICM model of management practice.

Another model of functional scaling-up is even more challenging as it addresses transborder biodiversity and other related environmental issues. This model requires the cooperation and collaboration of concerned local governments sharing a large ecosystem, such as a bay, lagoon, gulf, watershed or riverine system. For example, in the case of the Jiulong River basin in the Fujian Province of China, agriculture wastes (such as animal wastes from pigs and cattle, and fertilizers from paddy fields and vegetable farms) are the main cause of nutrient enrichment in Xiamen Bay located at the mouth of the Jiulong River, causing periodic red tides and harmful algal blooms (Huang and Hong, 2010). Addressing these issues will require national or provincial government intervention to coordinate and harmonize economic activities and execute more stringent law enforcement to effectively reduce the harmful environmental impacts (Peng et al., 2013). Similarly, sustainable management of Batangas Bay (Philippines) would require the close cooperation of the four municipalities and one city bordering the bay in terms of regulation of sewage, overexploitation, illegal fishing, marine litter, sewage and factory discharges (PEMSEA 2006a).

Expanding the management boundary beyond local jurisdiction as well as promoting replication of ICM working models throughout national coastlines is a workable and logical approach. Nevertheless, the time required to build national and local capability, as well as the speed at which the concept of integrated planning and management can be internalized at the local and national level, continue to be formidable management challenges.

Thus, in moving toward geographical and functional scaling-up of ICM practices for achieving the Aichi Targets, coastal management practitioners might wish to consider the following guiding principles:

a) For achieving the goals of the Strategic Plan and its Aichi Targets, it is always necessary to follow the principles of the ecosystem approach outlined earlier in this document. Ensuring the functional integrity of ecosystems is a sure way of effecting sustainable use. While adopting administrative boundaries in initiating and developing an ICM programme, the incorporation of an integrated planning and management approach within the ecological boundary is the ultimate target.

b) The ICM system involves a holistic approach to addressing marine and coastal area management problems covering both biodiversity and non-biodiversity issues. In order to adopt and replicate ICM practices, it is essential to recognize physical, ecological and socioeconomic

variations pertaining to different local conditions and different political and cultural set up. The flexibility in terms of time frame and outputs of the ICM system provides the necessary elasticity and dynamics depending on the local conditions and the availability of human and financial resources. The biggest challenge is securing local government commitment, as well as political and stakeholder support.

c) Management should make full use of available national policy, legislation or ordinances, especially those that promote integrated planning and management of coasts, seas, oceans, biodiversity and sustainable development. National coastal and ocean policy, if available, should be utilized to effectively promote ICM programme development and scaling-up of ICM practices. Successful ICM practices at the local level can also promote national efforts to develop coastal or ocean policy, legislation and strategies.

d) Building a critical mass of local and national managerial and technical skills in developing and implementing the ICM programme is a critical and urgent action to be undertaken as early as possible. While it is possible to invite international or foreign experts, ICM experience has shown that there are no substitutes for national and local capabilities. This is an area that requires national investments.

e) Finally, to complement the efforts mentioned, national communication plans need to be developed to create heightened awareness among the general public. Equally important is the gradual building up of a critical mass of informed stakeholders at local and national levels, who will serve as the champions and driving force for ICM implementation throughout the country.

5.4 SCALING-UP THROUGH SUB-NATIONAL IMPLEMENTATION

The following approaches might be useful to expedite sub-national–scale implementation of biodiversity-focused ICM programmes:

a) Build upon existing ICM framework and processes in demonstrating and validating the effectiveness of the ICM system in achieving specific Aichi Targets especially those related to marine and coastal biodiversity using the guidelines proposed in Section 4;

b) Summarize the lessons and experience learned from ICM practices to build upon its merits and avoid costly mistakes;

c) Fully and effectively utilize the enabling environment to promote and encourage local governments to replicate ICM practices based on specific local conditions. Within a reasonable period of time, a critical mass of local expertise on ICM with focus on biodiversity concerns will be developed; and

d) Reinforce local efforts with organized technical training on the various ICM methodologies and tools. Of equal importance is to scale-up ICM practices across local jurisdictional boundaries. This could be done by demonstrating the effectiveness of cross-boundary management over the entire ecosystem. The level of coordination will be shifted from individual city or municipality to a higher administrative level such as the province or state.

Building upon the approaches above, ICM practices could then be propagated at the sub-national level using a standard ICM framework and the scaling-up processes. The key to success in using the ICM practices for achieving various Aichi Targets will largely depend on the dynamism and skills of the coastal practitioners in applying the ICM tools and dynamics in diverse political, geographical, ecological and socioeconomic settings.

5.5 NATIONAL IMPLEMENTATION

It was emphasized at the beginning of this guidance document that loss of biodiversity and reduction in the delivery of ecosystem services are parts of the many environmental and sustainable development challenges that should best be addressed within the overall coastal management framework of the ICM system because these issues are interlinked with varying or similar underlying causes. As such, addressing such issues in isolation might not meet the desired results in the desired time frame. Based on this argument, the NBSAPs may be implemented as an integral part of, or at least in parallel, with national marine and coastal area management plans to help remove some of the common barriers to sustainable biodiversity conservation.

It is also not realistic or cost-effective to endeavour to achieve Aichi Targets in isolation. This must be undertaken as an integral part of the ICM programme at the sub-national level. The role of the national government, therefore, is to promote, facilitate and support the implementation of biodiversity-focused ICM programmes throughout its coastline. To facilitate nationwide implementation, the national government could contribute immensely not only in terms of creating the enabling environment mentioned above, but also in assisting the foundation of a stronger network of environment-conscious corporations; such a network provides these corporations with a venue where they can more effectively discharge their corporate social responsibilities in areas such as MPAs, waste management and habitat revitalization programmes. Another area in which the national government could take part is the setting up of performance standards and indicators to be attained by the sub-national government to receive national or international recognition, such as the ISOs. Standardizing the ICM reporting system to incorporate the Aichi Targets could be another area, so that the concerned authority can closely monitor implementation progress and evaluate impacts.

5.6 SUB-REGIONAL AND REGIONAL IMPLEMENTATION

Addressing biodiversity or any transboundary marine and coastal area concerns requires the cooperation of the neighbouring countries sharing the common ecosystem. They may be located within a larger riverine ecosystem or across several ecosystems within a gulf and straits. They may be sharing a common sea or a large marine ecosystem. Managing biodiversity and other sustainable development challenges across the national boundary is certainly a much more difficult task than those faced by local governments due to diverse political and socioeconomic interests as well as cultural and religious characteristics. PEMSEA's effort to implement the Sustainable Development Strategy for the Seas of East Asia (SDS–SEA) represents one attempt during the last two decades to forge regional cooperation in addressing a host of sustainable development challenges, including biodiversity issues, of the East Asian Seas.

The SDS–SEA set six strategies and 217 action programmes that are expected to be implemented by member countries over the next 25 years (PEMSEA, 2003). The strategies are as follows:

a) Sustain: Ensure sustainable use of coastal and marine resources;

b) Preserve: Preserve species and areas of the coastal and marine environment that are pristine or are of social, cultural or ecological significance;

c) Protect: Protect society, ecosystems and human health from risks occurring as a consequence of human activities;

d) Develop: Develop economic activities in the coastal and marine environment that contribute to economic prosperity and social well-being while safeguarding ecological values;

e) Implement: Implement international instruments relevant to the management of the coastal and marine environment; and

f) Communicate: Communicate with stakeholders to raise public awareness, strengthen multisectoral participation and obtain scientific support for the sustainable development of the coastal and marine environment.

A careful review of the strategies and the detailed action programmes of the SDS–SEA and the CBD Strategic Plan, with its Aichi Biodiversity Targets show that they are complementary in objectives, scope, and approaches. The strategies of the SDS–SEA cover most of the biodiversity and related sustainable development concerns addressed by the CBD Biodiversity Strategic Plan and thus contribute to achieving the Aichi Targets.

The *Sustain Strategy* aims to: (1) ensure sustainable use through biodiversity conservation and management for their intrinsic value as well as their ecological, genetic, social, scientific, educational, cultural, recreational and aesthetic value in accordance with the Convention on Biological Diversity and the programme of work on marine and coastal biodiversity and restoring coastlines, habitats and resources that are of significant biodiversity and natural value; (2) maintain and enhance the quality of coastal waters; and (3) ensure sustainable fisheries through responsible fishing, conservation of fish stocks and equitable distribution of benefits to the coastal poor. In a way, this strategy covers CBD Strategic Goal B to reduce the direct pressures on biodiversity and promote sustainable use; specifically, it is complementary to Target 6 on sustainable harvest of fisheries, invertebrates and aquatic plants and, to a large extent, Target 7 on sustainable management of forestry, agriculture and aquaculture.

The *Preserve Strategy* has three aims: to manage marine protected areas; to safeguard rare, threatened and endangered species and genetic resources; and to conserve transborder areas of social, cultural, ecological, historical and geological significance. The action programmes largely focus on these aspects: developing common management systems for MPAs, especially of transborder importance; establishing regional accord for the protection of species at risk including implementing their national recovery and management processes; and creating region-wide safety nets for those species at risk and for conserving genetic resources. This strategy can effectively address Strategic Goal C of the CBD Strategic Plan for Biodiversity 2011-2020 to improve the status of biodiversity by safeguarding species, ecosystems and genetic resources covering targets 11 (MPAs), 12 (extinct or endangered species) and 13 (genetic diversity).

The *Protect Strategy* aims to reduce coastal and marine degradation from land- and sea-based human activities as well as establishing sub-regional mechanisms to combat transboundary threats to regional seas. The focus of the action programmes is on the following: reducing pollutants from land-based discharge that adversely affect the ecosystem and human health, particularly focusing on local, national and regional efforts to stop or reduce the level of hypoxia in coastal bays and lagoons; stopping or reducing the spread of "dead zones" in coastal seas; and reducing or completely stopping the discharge of chemicals. The action programmes also address the pollution caused by sea-based activities, such as discharge from ships (e.g., chemicals, oil spills and ballast waters), mining (e.g., sands, minerals and oil deposits) and coastal reclamation. The *Protect Strategy* also facilitates the development of regional and sub-regional mechanisms to address pollution that needs regional cooperation, such as the sub-regional mechanism for combating oil spills at the Gulf of Thailand. This strategy and its action programmes directly contribute to Strategic Goal B, particularly in achieving Target 8 (pollution reduction) and Target 9 (alien species), although Target 10 (anthropogenic pressures on ecosystems) is also partially relevant.

The *Develop Strategy* aims to sustain economic activities that contribute to economic prosperity and social well-being while safeguarding ecological values. More specifically, this strategy focuses on these objectives: (1) promote existing or new economic activities that meet the principles of sustainable development; (2) develop and use ICM as an effective management framework for marine and coastal

sustainable development particularly at the sub-national level; (3) promote transboundary environmental management in sub-regional growth areas, such as those growth triangles in Asia; and (4) develop and promote stronger partnerships in sustainable financing and environmental investments to effectively utilize the human and financial resources of the private sector in environmental investments through public-private sector partnerships or through creating favourable environmental investment policies that encourage private sector investments.

The action programmes for promoting sustainable development require clearly defined national policies and strategies, institutional arrangements at national and sub-national levels, mechanisms for effective public participation, and integrated planning that incorporates environmental management into the economic development programmes. Along with the action programmes on ICM, which in fact contribute to addressing most of the Aichi Targets as illustrated in the earlier sections and that on sub-regional environmental management, this strategy has a larger implication for all the CBD strategic goals. Through national policy, legislation and strategies, the action programmes of the *Develop Strategy* incorporate National Biodiversity Strategies and Action Plans (Target 17), promote effective use of traditional and scientific knowledge and processes (Targets 18 and 19), and, more directly, the mobilization of sustainable financing (Target 20).

The *Implement Strategy* is unique in that it focuses on the implementation of international instruments relevant to the management of marine and coastal areas by implementing action programmes to attain the following: (1) promotion of national accession to and compliance with relevant international conventions and agreements; (2) facilitation of regional cooperation in integrated implementation of international conventions; and (3) execution of international commitments at the local level by incorporating relevant international commitments into its local ICM programmes. The Convention on Biological Diversity can therefore be effectively addressed, in addition to the Nagoya Protocol (Target 16), along with other relevant international conventions, such as Global Plans of Action on Land-based Pollution (GPA), MARPOL Convention (1972), Oil Spill Response and Co-operation (OPRC) and the United Nations Framework Convention on Climate Change (UNFCCC).

The *Communicate Strategy* aims to develop stronger stakeholder communication mechanisms to raise public awareness, strengthen multisectoral participation and obtain scientific support for the sustainable development of marine and coastal areas. The action programmes focus on the following: (1) raising public awareness and understanding of environment and resource management issues and processes particularly in internalizing the protection of ecosystem functions and the sustainable use of ecosystem services in marine and coastal areas into the public agenda (Target 1); (2) promoting utilization of science and traditional knowledge in the decision-making process (Targets 18 and 19); and (3) mobilizing government, civil society and the private sector in utilizing innovative communication methods.

The six strategies and 217 action programmes of the SDS–SEA in its entirety have provided the following:

a) A very comprehensive coverage in addressing a wide range of diverse environmental and sustainable management issues of the region;

b) Local, national and regional sustainable management frameworks and integrated planning and management processes to ensure sustainable use of ecosystem services in diverse political, cultural, ecological and socioeconomic conditions;

c) Approaches for integrated implementation of relevant environment and sustainable development — related international and regional conventions, protocols and agreements for meeting international commitments;

d) The necessary national policy and management framework and tools for developing integrated planning and management of marine and coastal areas; and

e) Development of a flexible but dynamic platform for regional consultation and cooperation.

While biodiversity issues have been adequately included in the SDS–SEA strategies and action programmes, they are not specifically directed to address the Aichi Biodiversity Targets because the former was established in 2003, seven years prior to the adoption of the CBD Strategic Plan for Biodiversity 2011-2020 at COP 10. However, the SDS–SEA in its entirety has clearly been able to address the CBD targets and can, thus, serve as an effective regional framework for achieving them by incorporating the Strategic Plan in the formulation of national SDS–SEA action programmes.

6. IMPLEMENTATION CHALLENGES: LESSONS LEARNED

The purpose of this section is to distill the key lessons learned from experience in the implementation of ICM as well as to discuss how these lessons can help reduce implementation challenges in initiating and implementing local biodiversity-focused ICM programmes and National Biodiversity Strategies and Action Plans (NBSAPs).

6.1 INTRODUCTION

As mentioned in the previous sections, implementation of the CBD Strategic Plan for Biodiversity to meet the global Aichi Biodiversity Targets is a challenging task for national governments, especially within the specified time frame. The challenge is not only that national governments should develop, revise and implement an NBSAP but also that the approach and methodology for achieving the targets has yet to be developed and standardized.

This document has shown how ICM practices address many of the biodiversity concerns in the context of sustainable marine and coastal development. Through the process of replication and geographical expansion of the ICM practices, many Aichi Targets would be achieved at the local level. This document has also shown that the development of a regional marine strategy is complementary to the Strategic Plan for Biodiversity (2011-2020) at the regional scale. These experiences and lessons are useful guides not only for any future endeavours in the application of similar approaches in other parts of the world but also for addressing the implementation challenges highlighted in Section 1.

6.2 MAJOR LESSONS LEARNED FROM IMPLEMENTATION OF ICM PRACTICES

Valuable lessons were drawn from implementation challenges encountered through experience in implementing ICM. These lessons are intended to help new ICM practitioners avoid costly mistakes in approach and practice due to lack of experience and know-how.

a) Building local acceptance and ownership should remain the key focus of ICM practices.

Before developing and implementing an ICM programme, considerable effort and time must be given to securing both local acceptance of the ICM concept and the commitment of local authorities to invest human and financial resources. The purpose is to ensure ownership of the programme, inspire a sense of responsibility on the part of the local government and instill a sense of dedication to undertake such a massive management initiative.

Throughout the ICM process, an effective communication mechanism is needed to strengthen stakeholders' buy-in, partnerships and environmental stewardship as well as to put the local government in the driver's seat.

Financial incentives from bilateral or multilateral aid agencies may help to initiate the development of the ICM programme but without continued external funding, the ICM initiative can stall in the plan preparation stage. In such cases, ICM has not yet been internalized into the local government agenda. In some cases, ICM is treated as a scientific or technical project often handled by a group of scientists or foreign and/or national consultants. This has often resulted in a series of technical reports, strategies and plans or scientific publications but the much-needed programme implementation has often been

left for the next phase of funding; many of them never reach the implementation stage.

b) Creating perception change for paradigm shifts in planning and management is essential.

Although ICM is not a new practice and has been implemented in different forms with varying degrees of success, the integrated management approach has yet to be fully understood, appreciated and effectively implemented by local governments in many developed and developing countries. Economic development remains the primary focus of most governments. This is partly because ICM is not a conventional management practice nor are there strong financial or personal promotional incentives for government officials of concerned line agencies to adopt such management practices. The complexities in the ICM process tend to discourage local governments from adopting the new management paradigm. Obviously, there is a need for greater investment of time and effort, which should be factored in the ICM planning and operational processes.

The practical need for policy and functional integration to increase efficiency and cost-effectiveness in resource management, which is a major implementation challenge, are often ignored by local officials, who are more comfortable with the conventional sectoral approach. A thorough change in the operational paradigm might not be immediate but efforts toward this direction must be made as early as possible in the ICM process to build confidence and understanding of the merit of the ICM system. The fear of losing line agency budgetary entitlements and benefits often result in interagency resistance to change; this is why interagency cooperation often exists only in name rather than in actual operation. A dynamic interagency committee can alleviate such fears, especially if it is led and chaired by the head or the representative of the local government.

c) Building local capacity through "learning by doing" is an integral part of ICM programmes.

The capacity of the local government plays a critical role in the success and failure of ICM programmes. Project or programme personnel of concerned local government agencies and local scientific and academic institutions need to be equipped with integrated planning and management knowledge and skills to develop and implement ICM programmes. As such, they should be involved right from the early stages of the ICM cycle. Through the ICM cyclical processes, not only the project staff can benefit from practical involvement; other key local officials from other agencies and institutions involved in the project can also benefit from working with and learning from each other. Through such processes, both individual and institutional upgrading becomes possible. In short, all stakeholders directly involved, including officers, scientists, decision-makers and others, are learning from their direct participation. Building a critical mass of ICM practitioners and institutions capable of marine and coastal governance is a sure way of achieving an effective ICM programme on the ground. Admittedly, this process of "learning by doing" is long and tedious but it is an effective way of ensuring sustainability of the ICM programme.

National consultants with good training in marine affairs or coastal management may be able to help in the interim as they are more familiar with national and local conditions than foreign consultants. Importation of foreign experts to help is acceptable as long as the locals work alongside them.

Despite increasing efforts to provide academic training in coastal and ocean governance through marine affairs or integrated coastal management programmes in some selected universities in the world, the number of trained personnel is grossly inadequate for the increasing number of ICM initiatives around the world. Even if these qualified personnel are available, they still need practical experience, as intuitive knowledge (based on

past experience and knowledge) and intuitive thinking (Kahneman, 2011) still play important roles in management practices. Thus, "learning by doing" is essential to managing such complex problems in marine and coastal areas.

d) The precautionary principle and adaptive management continue to play key roles in the ICM system.

Both precautionary and adaptive management are two of the six core principles of sustainable governance (Costanza et al., 1998). As mentioned in the sections above, during the process of ICM implementation, management interventions might have to be made in situations where scientific and policy uncertainties are present. The precautionary principle is often applied in the interest of the public and the environment in cases where there is insufficient scientific evidence to justify a controversial management decision. This is to allow time for further scientific verification without necessarily creating irreparable damage to the ecosystem and environmental quality. On the other hand, adaptive management is a built-in mechanism of the ICM system, allowing continuing improvements of management policy and practices by learning from the outcomes of the operational programmes over various ICM cycles. Upon completion of each ICM cycle, management problems are being assessed and evaluated. Modifications to management policy or practices are then redefined and implemented in the following cycle, after which the outcomes are monitored, evaluated and adjusted as more information and experience become available (Chua et al., 2006). The cycle continues. The ICM system, hence, provides a self-improving mechanism and it is only through such adaptive management that the objectives of sustainable development can be achieved.

e) An informed public provides a strong political base for ICM programme implementation.

A substantial effort in the ICM programme is to keep the general public continuously aware of ICM activities, especially the benefits of sustainable use of ecosystem services and the roles the general public can play as stakeholders. Building public awareness is an important part of the ICM communication system with the intention of creating an informed public that will serve as a strong political base for the local government to continue placing the ICM programme in the local development agenda.

f) Making ICM visible improves interagency cooperation, local ownership and collective responsibility in meeting programme goals and objectives.

An ICM programme becomes visible when the concerned stakeholders are aware of the initiative. Such visible programmes will draw greater attention locally and nationally, thus promoting greater stakeholder participation and ownership. Public expectation of the ICM initiative tends to generate greater cooperation and commitment among the government and other stakeholders to collectively and responsibly deliver the expected programme outputs and outcomes. Linkage with United Nations or foreign-assisted ICM programmes can also enhance or increase the visibility.

Equally important is to deliver some visible results of ICM initiatives as soon as possible before the public loses interest. For that reason, every effort should be made to keep the stakeholders regularly informed of any achievement instead of waiting until the completion of the first ICM cycle. Regular release of ICM reports will be instrumental in keeping the public abreast of the progress made. Major achievements, such as the formation of an interagency mechanism, the stakeholders' consensus on the common vision, and outcomes of major studies should be part of the public material to be communicated through the target-specific communication plan of the ICM programme.

g) Working together remains a formidable challenge to institutional cooperation.

While it is easy to understand the need for line agencies and stakeholders to work together in the development and implementation of the ICM programme, in practice such cooperation has often been met with great difficulty. The "turf" mentality among line agencies to protect their own interest is one key obstacle that needs to be overcome. Budgetary benefits, recognition and personality issues often cripple

or slow down the operation. The purpose of interagency cooperation is to collectively develop the ICM programme and jointly implement the specific action programmes led by the relevant agency responsible. For example, an action programme related to sustainable fisheries must be implemented by the fishery agency even if the environment agency is the lead agency for the ICM programme. A successful ICM programme ensures key line agencies can play their respective roles through joint planning efforts. No single agency should be the sole beneficiary. Unfortunately, this is not always the case as shown from the experience of several ICM initiatives in the past. Selection of a neutral agency, such as a planning or economic development agency, will help to reduce such interagency conflicts and promote better cooperation among them. In many ICM initiatives in East Asia, the mayor or governor's office took the lead in the ICM processes. This, of course, is the preferred option.

h) Funding is essential but not a limiting factor in developing and implementing an ICM programme.

Past ICM experiences have shown that funding is necessary to initiate, develop and implement ICM programmes but it is not the limiting factor. For example, many local governments in developing countries are able to find the necessary financial resources to develop and implement ICM programmes.

Many of the provinces and municipalities that have implemented ICM in developing countries have limited financial capability, but with the willingness and political commitment of the local leadership, they were able to source additional funding from the business community, contributions from aid agencies and support from the national government to augment their local budgets. In fact, some of them have successfully utilized the ICM programme framework to catalyze millions of multilateral financial investments allotted for environmental improvement infrastructure (UNDP/GEF International Waters Programme, 2012). On the contrary, those local governments with full financial support from external aid agencies but lacking local commitment often failed to implement the ICM programme after the external funding had been exhausted.

i) The various stages of the ICM cycle should be strictly followed if the ICM system is to achieve its intended goals.

The purpose of the ICM cycle is, first, to ensure that the ICM programme is systematically developed and implemented following a step-wise process; and second, to ensure periodic and systematic revisions and modifications of management policy and practices in accordance with the progress made and changing local conditions. These sequential phases generate public policies and management decisions as components of good governance (Lasswell, 1956). Inability to continue with the ICM cycle for whatever reason has often resulted in failure to achieve the full targets. Past experiences showed such failures are often due to poor understanding of the ICM concept and working procedures, weak project staff, inefficient interagency coordinating mechanisms, and inadequate stakeholder participation and support. The success of the first ICM cycle is critical to ensure smooth entry to subsequent ICM cycles.

6.3 MAJOR LESSONS LEARNED FROM IMPLEMENTING THE SUSTAINABLE DEVELOPMENT STRATEGY FOR THE SEAS OF EAST ASIA (SDS–SEA)

Several lessons have also been learned from the implementation SDS–SEA with respect to regional coastal and ocean governance. These lessons are useful in building similar regional approaches in other parts of the world, especially in addressing transborder biodiversity challenges that require a holistic management encompassing entire ecosystems, such as regional seas or large marine ecosystems. The lessons below could serve as useful guideposts.

a) Management of economic and /or environmental activities across national borders cannot be undertaken without mutual support and cooperation of adjacent countries.

In addition to the complexity in sustainable management of marine and coastal areas, environmental management across national borders cannot be effective without the support and cooperation of the concerned adjacent governments and the stakeholders. Regional economic cooperation, including through growth triangles, has been possible and successful because of mutual economic benefits to the participating governments and concerned stakeholders. On the other hand, such mutual benefits might not be forthcoming in the case of transborder environmental management within the foreseeable time frame concerning direct economic benefits to the stakeholders.

Regional cooperation across borders will normally require each country's commitment to environment (including biodiversity) conventions and other relevant international agreements or protocols. In some regional seas, not all countries bordering the same coastline have acceded to all the relevant international conventions or protocols. Even if they have, not all of them would agree to join regional efforts for environmental improvements or sustainable management of the shared resources. Despite these obstacles, regional cooperation in environment and sustainable management of regional seas are still possible by allowing gradual participation of newcomers. Seemingly, regional cooperation requires considerable time and effort.

b) A comprehensive management strategy with long-term shared visions and broad-based action programmes provides a platform and framework for regional cooperation.

The SDS–SEA has proven to be a useful broad-based marine strategy with elaborate action programmes covering concerned sustainable development and environment-related international conventions and agreements focusing on achieving a shared vision of the region. Armed with a common vision and a long-term strategy and action programmes, regional cooperation becomes possible through building trust, partnerships and mutual support. However, this does not mean that there is no hitch in the process. Although policy differences and financial limitations might sometimes constrain regional collaborative activities, challenges at the operational level are often more difficult to resolve due to different personalities (perceptions, attitude and priorities) among the operating agencies of each country.

c) An efficient regional coordinating mechanism is indispensable for achieving the long-term visions and goals.

In view of the geographical size and complexities of the environmental and management issues, a regional coordinating mechanism is needed for harmonizing the implementation of the regional strategy and action programmes. The East Asian Seas region has significant experience in building regional coordinating mechanisms for various purposes. PEMSEA has been designated as the regional coordinating mechanism with a specific mandate to organize national implementation of the SDS–SEA. From PEMSEA's experience, an effective coordinating mechanism is one that can facilitate, mediate, moderate, bring together and assist member countries in discharging their regional and international commitments. As a regional coordinating body, PEMSEA has been able to mobilize national resources to develop and implement national SDS–SEA.

d) Regional partnerships are essential for forging regional cooperation and collaboration to address complicated transboundary environmental challenges.

Regional partnerships contribute to national implementation of existing relevant international conventions and protocols. They also contribute to joint implementation of specific international conventions such as the cooperation between three countries bordering the Gulf of Thailand in implementing one of the IMO conventions, the Oil Spill Response Co-operation (OPRC) (PEMSEA, 2011a; Chua, et al., 2008).

Building regional partnerships takes time in order to generate and consolidate common understanding, trust and a working relationship between partners in jointly undertaking activities leading to a common goal. Partnership is based on voluntary participation and, therefore, has no legal obligation. Thereby, partnerships could give rise to unpredictable outcomes if they are not built on a strong understanding, trust and commitment on the part of each partner. Regional partnerships are indispensable in areas with diverse political, cultural, religious, ecological and socioeconomic conditions. When regional marine conventions—such as those of the UNEP Regional Seas—fail to occur, the regional partnership approach appears to be the appropriate alternative.

e) Regional platform for regular coastal and ocean governance and management practices is effective in promoting regional cooperation for sustainable marine and coastal area development.

The East Asian Seas (EAS) Congress is one example of a regional marine platform that allows national and local policymakers, government officials, coastal and ocean economists, and environment planners, managers and experts as well as members from the business, scientific and academic communities and international organizations who are interested in contributing to the sustainable management of the Seas of East Asia to gather together under one roof to freely share and exchange information, experiences, new methods and innovative technologies related to sustainable development of the seas of East Asia.

6.4 POSSIBLE IMPLEMENTATION CHALLENGES TO ACHIEVING THE STRATEGIC PLAN AND AICHI BIODIVERSITY TARGETS

Implementation of the CBD's first Strategic Plan (2002-2010) was hampered by a host of obstacles (social, capacity, political, institutional, financing, information, collaboration and cooperation) (www.cbd.int/sp/2010). These obstacles are not easily resolved. Nor are they different from those impeding the implementation of environmental management programmes. These obstacles have been included in the development of ICM action programmes and the implementation of the SDS–SEA. In achieving the Aichi Targets through the application of the ICM methodology, the following major impediments still need to be overcome:

a) Insufficient political and financial commitment to protect and conserve biodiversity.

The underlying cause is the failure to balance short-term economic gains and political interests with the long-term sustainable economic benefits from protecting the ecosystem functions that generate goods and services. In many developing and developed countries, economic development remains the top priority on the government agenda. This approach, in fact, receives general public support. While there is increasing awareness among political leaders of the importance of environmental protection and the benefits of reducing biodiversity loss, social pressure is often not strong enough for the government to place environment management on the same priority level as economic development. Such political bias towards economic development is expected to continue within the foreseeable future.

b) Current institutional and individual capacity, especially at the local level, to undertake integrated planning and management is grossly inadequate.

As discussed in the sections above, the magnitude of human and economic pressures on natural resources in many parts of the world persistently increases, and the negative impacts on the fragile ecosystems continue to worsen. This might further aggravate the rate of biodiversity loss, which currently stands at an already alarming rate of one species a day. Even if there are political and financial commitments, effective implementation of the Strategic Plan for Biodiversity will not be possible without the necessary competent institutions and individuals. Thus,

capacity development needs to be incorporated in the implementation of the Strategic Plan.

c) While the general public in most countries has better appreciation for environmental quality, it is not fully aware of the severe consequences of biodiversity loss.

As it is, there is insufficient public support to generate the necessary public pressure to stop unsustainable economic development, improve environmental quality and reduce the rate of biodiversity loss. Public awareness campaigns need to be intensified at all levels, especially at the sub-national level, where actions are to be taken. The public needs to be aware of the value of biodiversity and how biodiversity contributes to daily life.

d) Conventional sector policy and management functions of resource-specific agencies continue to hinder efforts to coordinate and integrate management policy and practices.

Interagency conflicts should not be underestimated as many failures in the implementation of ICM programmes have often stemmed from the inability to secure genuine interagency cooperation. Interagency cooperation is needed to address externality issues such as pollution, overexploitation and illegal trade, which are beyond the direct responsibility of the conservation agency.

e) Conventional biodiversity conservation and sustainable use, which still prevail in most countries, cannot meet the increasing level of management challenges.

A paradigm shift in concept, conservation policy and management practices will be needed so that a systematic, integrated management paradigm can be put in place.

The sections above have outlined the concept and practices of the ICM system, which is suggested to be a viable integrated planning and management paradigm to be adopted for achieving the Aichi Targets. The obstacles mentioned can be addressed and overcome in an incremental and progressive manner at the local level and eventually at the national level through the ICM scaling-up processes.

7. CONCLUSIONS

The purpose of this section is to present the key conclusions derived from the previous sections in justifying and demonstrating the practical application of ICM for achieving the Aichi Biodiversity Targets. The conclusions are largely based on practical coastal and ocean governance experience. This section hopes to support environment policymakers and biodiversity practitioners in applying ICM in the context of national, sub-national and regional implementation of the CBD Strategic Plan for Biodiversity 2011–2020.

1. The various obstacles to the implementation of the CBD Strategic Plan 2002-2010 are essentially similar to those in environmental and natural resource management in inland, coastal and marine areas.

The various obstacles to the implementation of the previous CBD Strategic Plan (2002-2010) are generally related to policy, legislative and other management inadequacies complicated by social concerns (e.g., poverty and unemployment), lack of public and political support (e.g., lack of public awareness and diverse political interests), development priorities (e.g., economic development over conservation), insufficient financing resources (such as inadequate budget allocation and lack of private sector investments) and inadequate management capabilities (e.g., insufficient institutional and individual capability). Most, if not all, of these obstacles are also being confronted in natural resources management in inland, coastal and marine areas whether applying EBM, ICM, MSP, IWRM or any other management approaches. It is either one of the prominent obstacles or a combination of obstacles that cause policy and management failures and, hence, loss of efficiency and effectiveness in achieving the set goals or targets.

These obstacles need to be addressed either individually or collectively with a well-structured management programme. The ability to resolve these obstacles determines the level of success in programme design and action plan implementation. Removing or reducing these obstacles is a daunting task; sometimes, it is not within the capacity or authority of those charged with the responsibility of plan implementation, especially when the underlying causes are rather complex, often involving different political and sector interests, and usually difficult to resolve within a short time frame.

2. The key approach for effective governance and sustainable management of coastal and marine areas is "integrated management", which addresses the management complexities brought about by diverse cultural, political, ecological and socioeconomic conditions.

Integrated management has become the key approach in the management of the environment and sustainable use of ecosystem services, considering the multiple challenges of the diverse but interrelated inland, coastal and marine environments. Biodiversity concerns have to be part of the overall sustainable management programmes in order to be cost-effective. Unless biodiversity issues are high on the government agenda, it is difficult to expect priority allocation of government resources to address them. On the other hand, biodiversity concerns will more likely be addressed as part of the integrated management programmes for sustainable development.

ICM is largely based on an integrated management approach in addressing environment and resource management complexities. Like any common pool resource governance (Agrawal, 2003), ICM promotes integrated governance of the area or the entire ecosystem with strong involvement of local and national governments. Both local and national level management policy and practices are designed specifically to address key and related challenges of sustainable development, including common pool resources as well as those factors affecting them. Integrated management is different from conventional sector management in that the former places

greater emphasis on policy and functional integration, interagency coordination and cooperation, and reduction of multiple use conflicts. In ICM, integrated management at sub-national, national and regional levels has been tested, modified and standardized for achieving the common vision of the major stakeholders.

Integrated management is not easy to implement without strong belief, commitment and interpersonal skills as it depends not only on sound scientific knowledge of the issues but also on the leaders' capability to work with a wide array of stakeholders. The practical guidelines, therefore, take note of the complexity of the management challenges that need time, effort and skills. Hence, it is necessary to take an incremental, demonstrative approach to catalyze replication and multiplication of the biodiversity-focused ICM programmes and their scaling-up.

3. The ICM system, which employs a holistic, sequential and integrative approach to marine and coastal area planning and programme implementation, can enhance the cost- effectiveness of achieving the Aichi Biodiversity Targets at the sub-national level.

One of the key reasons for using the ICM approach as being implemented in the East Asian Seas region is that a substantial number of Aichi Targets have already been part of the management targets of ICM; therefore, it will be cost-effective to integrate the remaining Aichi Targets into the ICM framework, particularly those targets related to marine and coastal areas. The issue coverage, the participatory approach and the dynamics of the ICM system further add value to the biodiversity-focused ICM programmes. This is especially so in view of the limited time frame for achieving the biodiversity targets.

The ICM framework has proven to be a comprehensive planning and management system capable of addressing the major environmental, biodiversity and other sustainable development challenges in a holistic and sustainable manner. It has also proven to be applicable in both developed and developing countries through a cyclical process of administering and modifying management policy and practices. The incremental approach ensures the continued application of the system in achieving cost-efficiency within a more flexible and liberal time frame.

4. Mainstreaming and scaling-up of biodiversity-focused ICM programmes are practical approaches for implementing National Biodiversity Strategies and Action Plans (NBSAPs).

To be effective in achieving national biodiversity strategies and action plans, the NBSAP needs to be implemented at the local level for the local stakeholders to appreciate and value the benefits of ecosystem services. It is through the gradual and incremental geographical expansion and extension of ecosystem coverage that the national diversity goals can become a reality. Stakeholders at all levels need to realize that preventing biodiversity loss, restoring habitats, and preserving genetic resources are important societal responsibilities in sustaining economic benefits from nature.

It is therefore logical that local biodiversity-focused ICM programmes be mainstreamed into local government agendas throughout the country. The national government can make this happen by including the mainstreaming of biodiversity-focused ICM programmes into its NBSAP. Mainstreaming biodiversity requires national policy direction, institutional arrangements, and more importantly, the process of recognizing the value of ecosystems and internalizing the integrated management approach into local area planning and management programmes.

5. Political and economic opportunities should be utilized to promote ICM efforts for achieving the Aichi Biodiversity Targets.

Because of the diverse social, political and economic conditions in local areas, ICM practices should begin in areas where there is no or, at the least, minimal political or stakeholder resistance. The *Preparatory Stage* of the ICM cycle is therefore very important to ensure that the political environment is favourable and that there is increasing recognition of the economic opportunities for investing in biodiversity

protection and sustainable use of ecosystem services. Political support for biodiversity-focused ICM programmes will increase if the programmes are able to demonstrate economic and social benefits. It is advisable to delay the implementation of ICM programmes in areas where political and stakeholder resistance cannot be overcome.

The ICM system should be recognized as an effective comprehensive planning and management tool that ensures harmonization of multiple conflicts and optimization of economic gains from natural resource exploitation and utilization. Aichi Targets are the end products of the biodiversity-focused ICM programmes, and such products should be appreciated by all stakeholders if the integrated management efforts are to be sustained. As a comprehensive approach, the ICM system can achieve the Aichi Targets more readily and effectively. It can create the necessary enabling environment through increasing political will and mobilizing stakeholder's support.

6. Developing an informed public on the value of ecosystem services ensures that policy-makers and stakeholders will commit to and participate in national and local biodiversity-focused ICM initiatives.

ICM operation is a continuous process. Similar to sustainable development, there is a beginning for ICM but no end point. New challenges continue to crop up as one moves from one stage of the ICM cycle to another. This is because the social, political and economic conditions are never static but change with time, just as stakeholders change their expectations. As ICM is a dynamic management system, it continues to use adaptive management to adjust its management policy and practices in meeting new goals.

Another key driving force is an "informed public" created through the ICM processes using its communication strategy and plans. ICM utilizes the power of the public—who are made aware of the purpose of the programme and the values of ecosystem services—to raise financing, drive political will, forge interagency cooperation and encourage stakeholders' participation. However, creating an informed public is a formidable task requiring efforts and resources to cultivate public awareness, trust and collective actions. This is especially difficult with respect to biodiversity conservation that conventionally has been considered by most (including the political community and general public) to be of lower priority compared with promoting health, economic growth and human safety. As such, an effective communication strategy needs to be in place in order to forge a new paradigm for strengthening management practices toward safeguarding ecosystem services as part of the essential safety, economic and human health agenda.

7. Local-level ICM efforts form the pathway for achieving the Aichi Biodiversity Targets at the national, regional and global levels.

ICM practices are generally effective at the local level in meeting set goals and targets. First, ICM activities are confined within a manageable geographical scope of sub-national governments (i.e., provincial, municipality or city) where the local authorities have better understanding of the local issues and closer contacts with concerned stakeholders. Second, the types of environmental concerns are more confined, and management actions can be more effective with the support of the local stakeholders. Third, a better team of trained local officials will be in place as well as a better enabling policy, financing and integrated management environment to continue the ICM efforts. And fourth, there might be successes and failures in the process of local implementation, which generate useful lessons and experiences.

Multiplication of the successful ICM efforts throughout the country will certainly move the nation toward achieving its sustainable development goals. It is because of this that a multiplication and scaling-up of biodiversity-focused ICM programmes would enable the nation to achieve its committed national biodiversity targets. National efforts in policy enhancement and capacity development will be very useful in catalyzing financing from the private sectors, bilateral organizations or multilateral financing institutions for environment or biodiversity improvement programmes.

8. Scientific knowledge is always essential to strengthen policy and management decisions but wise use of adaptive management and the precautionary principle are even more important in times of scientific and/or political uncertainty.

ICM is designed to address a host of environmental management complexities that require reliable scientific information for developing appropriate and effective management interventions. More often than not, however, scientific information is not available as scientific research has not been able to catch up with the rate of environmental degradation caused by human activities. As observed by de Jonge et al. (2012), the social, economic and ecological complexity has been a significant impediment to providing integral indicators or indices matching the "ecosystem approach" that policy-makers can utilize. Under such cases of scientific uncertainty, the precautionary principle must then be applied.

ICM programmes need to be regularly monitored, evaluated and modified from time to time due to changing conditions in management areas. The changing environment might be due to political influence, budgetary constraints, limited capacity or ineffective implementation of management practices. The concept of adaptive management is to allow such modifications of management policy and practices to take place as the ICM process moves from one cycle to the next.

9. Intuitive knowledge and thinking continue to play an important role in the administration of management interventions in addressing the policy, environmental and socioeconomic complexities.

As much as possible, ICM action plans should be based on reliable scientific information. However, in actual practice, this is not always the case. Decision-making is sometimes based on intuitive knowledge of the coastal managers or responsible local leaders, based on past practices or management measures. As such, ICM practices tend to rely on vast experience and knowledge of the past, especially on traditional knowledge and experience in managing natural resources.

A successful ICM programme not only needs to follow the concept and processes of the ICM system but also needs to have the right group of coastal managers and practitioners with good intuitive thinking and knowledge. Despite modern management tools and improved scientific knowledge, these are not sufficient to cope with the changing conditions of the inland, coastal and marine areas where a large part of the human population resides. Unfortunately, ICM management is still between the realm of art and science.

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ANNEX. PEMSEA AND THE CBD

1. Relevance of PEMSEA to the goals of the CBD

PEMSEA is now an international organization on coastal and ocean governance, formally established through recognition of its international legal personality in 2009 by eight countries of the region, namely Cambodia, China, DPR Korea, Lao PDR, Philippines, RO Korea, Singapore, and Vietnam. PEMSEA started in 1993 as a GEF/UNDP regional international water programme for the seas of East Asia, transforming itself over three GEF programme phases from initially focusing on marine pollution prevention and management to developing and implementing a regional SDS–SEA (Chua, et al.,1999). It takes a long-term, results-oriented management approach to address environment and sustainable development challenges for the coastal and marine areas of the region. Over a span of 20 years, 14 countries in the region—Brunei Darussalam, Cambodia, China, DPR Korea, Indonesia, Japan, Lao PDR, Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Timor Leste and Vietnam—have participated in PEMSEA's activities.

Over the 20-year period, PEMSEA's regional efforts have been directed at promoting coastal and ocean governance and management at local, national and regional levels. At the local level, PEMSEA concentrated on the implementation of ICM by developing demonstration and parallel sites to initiate, practice and demonstrate ICM values and effectiveness for addressing environment, conservation and other sustainable development challenges commonly faced by local governments. Through several ICM practices, PEMSEA was able to define and refine the ICM concept, improve the process, and standardize the working modalities into an ICM system to meet international standards of governance and environmental management. At this level of operation, integrated coastal and marine planning was attempted, refined and finalized through allocation of marine space for its best functional uses, such as the functional zoning schemes being practiced throughout the coastlines of China.

Policy and legislative improvements were also made to reduce conflicts in sectoral policy and eliminate inconsistencies with outdated legislation to facilitate management interventions. Of utmost importance is the strengthening of an interagency coordinating mechanism in coastal and marine management that functions to significantly reduce cross-sectoral and interagency conflicts and is able to harmonize the role and responsibilities of each organization. Information was generated through ICM programme development, and the technical data gathered were transformed into visible information, such as in the form of a management atlas, easily accessible to stakeholders. Through efficient communication skills, the information became crucial in motivating strong public support, which is the foundation for the changes in attitude of the locals with regard to coastal and marine management. Local institutional and individual capacities are gradually developed where ICM initiatives are successful in mobilizing the participation and commitments of concerned agencies and stakeholders.

Through local ICM programmes, PEMSEA addressed these five areas of environment and sustainable development concerns (Fig. 2.3): disasters, pollution, overexploitation, freshwater shortage and biodiversity loss. These interconnected and mutually influencing sustainable development issues are common to almost all the countries in the region, the resolution of which requires comprehensive and collective planning for designing issue-specific management interventions.

Other relevant priority issues may also be included. Attempts to address these issues help to refine methodology, improve experience and enhance management options. Of primary importance is the increase in confidence among local governments involved in ICM practice moving them towards sustainable economy, environment quality improvement, sustainable ecosystem services and, above all, advancing their ability to address other pertinent issues such as the increasing challenges of climate

change that affect lives and properties. The obvious changes arising from ICM practices respond well to increasing public demand for cleaner and sustainable industries, improvement of quality of life, and desire for biodiversity conservation. The local governments have proven to be an obvious driving force for changes toward meeting these public demands.

After setting up ICM model sites, PEMSEA facilitated the scaling-up of ICM initiatives throughout national and regional coastlines. This was done through the setting up of PEMSEA's Network of Local Governments for Sustainable Coastal Development (PNLG) with the purpose of promoting ICM practices through learning and sharing of experiences and working models among members of the network. Since its inception in 2006, PNLG members practicing ICM have steadily increased from 2 to 35, covering more than 27,000 km of coastline and more than 330,000 km^2 of watersheds, affecting the lives and properties of an estimated 150 million people. At the same time, the scaling-up of ICM practices is also promoted through national ICM legislations, ordinances, presidential decrees, or administrative guidelines such as those of the Philippines, Republic of Korea, China, Japan and Vietnam. PEMSEA countries have set a target of placing 20 per cent of the regional coastlines under the ICM system by 2015. So far about 11.5 per cent has been achieved

At the national level, PEMSEA promotes the development and enactment of national coastal and ocean policy or legislation or other administrative orders to facilitate coastal and ocean governance toward achieving sustainable development of coasts and oceans. Over the last two decades since the start of the PEMSEA programme, most countries in the region have developed or enacted coastal or ocean policy or other national environmental and sustainable development related legislations, ordinances or special presidential orders to address the intensifying and often unchecked exploitation of living and non-living resources in coastal and marine areas, in the Exclusive Economic Zone (EEZ) and in areas beyond national jurisdiction. However, increasing interests in the natural resources in these waters and the seabeds are expected to amplify the boundary and use conflicts between countries. Even under such situations, PEMSEA remains relevant and distinctly important in providing a common, non-political platform to allow country partners to continue their dialogues while existing conflicts are being resolved.

At the sub-regional level, PEMSEA promotes national efforts to address environmental and sustainable development issues across jurisdictional boundaries within and across national borders. In the Gulf of Thailand, for instance, PEMSEA facilitated the signing of a cooperative agreement between Thailand, Cambodia and Vietnam in developing and implementing the IMO Convention on Oil Spill Preparedness and Response Cooperation (OPRC) with technical support from a non-country partner, the East Asia Response Limited (EARL) (now the Oil Spill Response Limited or OSRL). The concerned countries share pertinent information, develop oil spill trajectory models, help each other in capacity development and perform periodic oil spill response exercises.

PEMSEA also promoted cooperation between lowland and upland municipalities to address the transboundary environmental impacts caused by upstream pollution discharge. For example, the Municipal Government of Xiamen, which has been implementing ICM for several years, found it necessary to cooperate with the upstream local municipalities in order to be effective in controlling pollution at the mouth of the Juilong River where Xiamen is located (Peng, et al., 2013). Cooperation between upstream and downstream municipal governments was facilitated by both the Xiamen Government and that of the Provincial Government of Fujian, with the latter assuming the role of coordinating body.

At the regional level, PEMSEA has facilitated the development and implementation of the SDS–SEA, a regional marine strategy focusing on eliminating barriers to sustainable coastal and marine development in the six regional seas of East Asia, namely the Yellow Sea, the East China Sea, the South China Sea, the Sulu-Celebes Seas, the Indonesian Seas and the Gulf of Thailand (Figure A.1).

Figure A.1. Map of the Seas of East Asia showing the key large marine ecosystems (Chua 2008).

The SDS–SEA adopts six strategies, namely to sustain, preserve, protect, develop, implement and communicate, within which action programmes are developed and implemented (PEMSEA, 2003). The six strategies are intended to collectively drive national and regional efforts to do the following:

- Continue or increase national efforts to ensure **sustainable use** of coastal and marine resources;
- Put extra efforts to intensify the **preservation** of biological diversity especially preserving species and coastal areas that are pristine or are of social, cultural and ecological significance;

- Intensify further efforts to **protect** ecosystem and human health so as to preserve their functional integrity and resilience, and to sustain the delivery of ecosystem services; where needed, restore damaged habitats to regain their ecological functions;
- **Develop** sustainable use of ecosystem services to increase livelihoods, reduce poverty and improve economic benefits through economic activities that are environment friendly and those that are capable of preserving ecological values;
- **Implement** international conventions related to the environment and sustainable development,such as the United Nations Convention on the Law of the Seas (UNCLOS), the Convention on Biological Diversity (CBD), Agenda 21, the Plans of Implementation of the World Summit on Sustainable Development (WSSD), International Maritime Organization (IMO) conventions and United Nations Environmental Programme (UNEP) conventions and protocols; and
- **Communicate** with stakeholders at all levels to keep the public informed of the need for cooperation and support through implementation of communication plans.

For the regional marine strategy to be effective, SDS–SEA must be internalized and be a part of the national marine and coastal development agenda. To cultivate regional ownership, PEMSEA developed the strategy through extensive consultations and modifications over a period of three years (2000–2003). It secured the member countries' consensus and commitments to support and implement the SDS–SEA through the non-binding Putrajaya Declaration, which was approved in Malaysia in 2003. Recognizing the need for regional coordination and facilitation, the countries endorsed PEMSEA as the implementing body three years later through the Haikou Declaration in China in 2006. Further, in 2009, member countries endorsed PEMSEA's international legal personality so that PEMSEA can operate more effectively as a full-fledged international organization to focus on coordinating and facilitating the implementation of the SDS–SEA (PEMSEA, 2007).

In achieving the regional vision and mission, PEMSEA undertakes the following measures to enable the countries to continue and intensify their efforts in the implementation of the SDS–SEA:

First, PEMSEA continues to strengthen its capacity development programmes to develop a pool of coastal and marine managers with the capability to implement integrated planning and management of the coasts, islands and seas in a sustainable manner. At the same time, special-skills trainings relevant to ICM and regional ocean governance are organized.

Second, PEMSEA continues its efforts to encourage and facilitate decentralization of coastal and ocean governance responsibilities to the local authorities through national coastal and ocean policy development and implementation. In countries where local government has little or no jurisdiction over the management of the coasts and seas, PEMSEA facilitates the development of ICM demonstration or parallel sites in close cooperation with national authorities to collectively assist attempts for local government to take on such responsibility. This effort tends to build confidence and trust between the central and local government and initiate the devolution of coastal management responsibilities to the local authority, which is increasingly occurring in China, Japan, Vietnam and DPR Korea.

Third, PEMSEA continues to promote further expansion of the PNLG so as to extend wider ICM coverage to at least 20 per cent of the regional coastline. This effort will need increasing appreciation of ICM benefits to local and national governments. As such, compelling communication efforts must take effect to reach out to policymakers, interests groups and the general public to convince them of the beneficial impacts of ICM. Existing ICM demonstration and parallel sites around the region have served as showcases for ICM implementation under different political, cultural and socio-economic conditions. This regional network, which is hosted by the Xiamen Municipal

Government, is taking on a stronger proactive role in promoting and engaging their local counterparts throughout the region to embark on new ICM initiatives through their annual work programmes.

Fourth, PEMSEA places considerable effort on promoting understanding of the feasibility and effectiveness of integrated implementation of multilateral environmental agreements at the local or sub-regional levels. For example, several relevant UN, IMO and UNEP conventions—such as UNCLOS, CBD, UNCED Agenda 21, Global Programme of Action (GPA) on Marine Pollution, Oil Spill Preparedness, Response and Co-operation (OPRC), UNFCCC, MARPOL Convention—may be implemented by local coastal authorities through implementation of ICM programmes through the collective efforts of various agencies, such as the Ministry of Environment, National Ocean Agency, Ministry of Transport, Port Authority, and Ministry of Agriculture and Fisheries, among others. ICM is understood to be a broad integrated management framework with practical tools that enable these agencies to work together in an integrated manner such that duplications and conflicts are minimized while achieving cost-efficiency and fulfilling international obligations.

Fifth, PEMSEA continues to develop and improve its methodologies and approach in scaling-up of ICM coverage across the jurisdictional boundary of local governments to address environmental challenges arising from the geographical and ecological linkages between upstream and downstream municipalities. Economic activities in the watershed areas and riverine systems—such as mining, agriculture, deforestation, animal husbandry, manufacturing industry and dam constructions—have adverse impacts on environmental quality, ecosystem services and health and safety of downstream population. In addition, shipping, coastal urbanization and port development invariably impact the livelihood, terrestrial ecosystems and economy of upstream municipalities.

PEMSEA promotes better understanding among political leaders, economic and environmental managers, and other concerned stakeholders in both upstream and downstream municipalities on the socioeconomic and ecological linkages between them and the need to integrate the long-term planning and management of their natural resources and better use of their ecosystem services. Thus, ICM should not be seen as a new management programme requiring a lot of new investment from local or central governments; rather, it should be seen as an innovative and dynamic mechanism that facilitates the cooperation of multiple agencies and stakeholders within and as part of their own responsibilities.

Finally, PEMSEA strengthens partnerships between stakeholders at all levels to build on the collective efforts of individuals and draw from corporate responsibilities in addressing common challenges. PEMSEA believes that only through building a stronger partnership among governments, local communities, business communities, non-governmental organizations, and scientific and educational communities can the complex management challenges be effectively resolved in the interest of this and future generations.

Thus, the measures given are aimed at ensuring that the basic policy and management fundamentals are put in place in each country to enable their respective governments to undertake the development and implementation of ICM programmes within their national coastlines. The confidence and achievements made at the local level will certainly enhance national commitments in developing the much-needed national coastal and ocean policy and legislation to implement national and regional programmes such as the SDS–SEA. The ability to propagate integrated coastal and ocean governance therefore depends on in-depth understanding and buy-ins from stakeholders, political leaders and economic and environmental managers. PEMSEA's partnership approach and experience in the development and implementation of the regional SDS–SEA

can be a good showcase for replication in other regions around the world.

PEMSEA's approach and methodologies are reflective of the implementation measures proposed by CBD in the following manner:

a) Through implementation of the SDS–SEA at the regional, national and local level, PEMSEA has effectively engaged all governing and management agencies, sectors, NGOs, scientists, the business community and other stakeholders at different levels to share knowledge, information, experiences and practices. Such efforts could be replicated in other marine and coastal areas around the world with special focus on achieving the Aichi Targets;

b) The triennial East Asian Seas Congress organized by PEMSEA and its 11 country and 19 non-country partners is an excellent example of how partnerships work in sharing information, knowledge, experience, and practices on all aspects of coastal and ocean governance and management. Stakeholders and interest groups are present under one roof to discuss and debate on all aspects of sustainable development challenges, with particular emphasis on environmental and conservation issues.

   At such congresses, policymakers in attendance, including ministers from the country partners, receive reports from the participants pertaining to issues of immediate concern. Ministers attending the Ministerial Forum as part of the EAS Congress's major focus are also expected to pledge their commitments to respond to some of the key environmental concerns and provide directions in addressing them. In this way, policymakers are constantly kept abreast of the current state of the environment and health of the ecosystems. Their participation is vital.

   The triennial congress also hosts an international conference covering at least six major concerns through at least a dozen technical workshops accompanied by an exhibition of outcomes and outputs of coastal and ocean management practices. An important inclusion is the Youth Forum, which brings 150-200 university students, graduates or young scientists from the region to learn and participate in the forum discussions. Through the Congress, interactive communications among scientists, policymakers, business communities and other stakeholder groups are vigorously promoted. Replication of such a congress in selected regions of the world would certainly provide a very useful platform for stakeholders who share common concerns, cultural practices and economic activities within defined geographical areas.

c) PEMSEA promotes individual and institutional capacity development through "learning by doing" during the process of developing and implementing ICM programmes. In addition, PEMSEA organizes specialized skill training with its technical partners for target participants from countries of the region. Moreover, such courses are also offered to interested participants from other regions. The CBD Parties can take advantage of PEMSEA's earlier capacity development efforts to organize or jointly organize specialized training courses for other regions of the world.

d) PEMSEA's ICM approach is to build local partnerships in addressing sustainable development challenges, including biodiversity conservation and sustainable use of ecosystem services. Duplicating PEMSEA's ICM approach with special focus on achieving the Aichi Targets related to coastal and ocean biodiversity will enable demonstration of working partnerships in balancing conservation with economic use. This could facilitate speedy replication of ICM programmes around the world.

2. Relevance of PEMSEA's capacity development approach to the CBD's capacity development initiative, the Sustainable Ocean Initiative (SOI).[7]

PEMSEA's capacity development programme is built upon the following philosophy and needs:

a) Integrated management of the coastal and marine areas is a complex governance and management system that requires skillful coastal planners and managers to initiate, facilitate, negotiate, moderate, develop and implement a set of management actions for achieving a balance of biodiversity conservation and sustainable use of ecosystem services. It addresses a host of economic and environmental development challenges in a holistic, systematic and sustainable manner. The best way of achieving this is by implementing ICM programmes at the local level;

b) Local government is the driving force for change at the local level and should, therefore, lead the processes of developing and implementing ICM programmes. This is because the local authority has a better appreciation of the local problems and better understanding of the aspiration of the local communities. It has closer contacts with the stakeholders and better command of local management actions. Above all, it has the direct responsibility for ensuring the environmental and social well-being of those under its administrative jurisdiction;

c) ICM requires the expertise and experience of a mixed team of local officials with various capabilities and skills, including marine and coastal planning, governance, management, financing, communication, information-gathering and knowledge management. The latter is of particular significance because the application of ICM requires a wide range of knowledge and skills covering various disciplines dealing with policy, legislation, public administration, law enforcement, economics, social, cultural, environmental and ecological disciplines as well as an understanding of physical, chemical and biological sciences specifically pertaining to terrestrial, marine and coastal ecosystems. Therefore, the key personnel of ICM should preferably be those with comprehensive knowledge and skills in the development and implementation of projects and programmes. Unfortunately, such skills are not readily available through the conventional formal and informal training programmes;

d) Coastal managers practicing ICM should possess interpersonal skills to deal with various types and levels of stakeholders. Furthermore, coastal managers should possess good comprehensive knowledge of the marine and coastal issues to facilitate holistic planning and management, mobilize human and financial resources, and secure political support and the support of stakeholders. It would be even better if they have also developed a passion for sustainable development;

e) PEMSEA builds individual and institutional capacity through "learning by doing" using the key components of the ICM system, namely SCDF, the processes of the ICM cycle, the partnership-building approach, monitoring, evaluating and reporting mechanisms. This will generate a team of workers with practical skills at the individual and institutional level. Together with other technical skills in implementing an ICM programme, the capacity of the concerned local government will eventually be upgraded and considerably strengthened across various stakeholder partners;

f) PEMSEA builds national ICM learning centres in selected countries of the region to promote the development of ICM as a multidisciplinary management training programme to correspond with the socioeconomic and cultural characteristics of the particular area or nation. The ICM learning centers are set up to build a pool of expertise in the institution that can serve the human resource needs of the specific area, country or region. In addition,

7 For details, refer to the Sustainable Ocean Initiative Action Plan 2015-2020 at https://www.cbd.int/doc/meetings/mar/soiom-2014-02/official/soiom-2014-02-actionplan-en.pdf

PEMSEA also establishes a recognition system to distinguish national centers of academic excellence as PEMSEA's Regional Centers of Excellence (RCOEs); an example of this is Marine Environmental Research and Innovative Technology (MERIT) in Hong Kong, a centre that specializes in marine pollution; and

g) Based on the required skills, PEMSEA organizes specialized training courses, such as those on risk assessment, valuation of natural resources, marine spatial planning (MSP), GIS and the integrated information management system in addition to the regular ICM training courses.

SOI could make full use of the initiatives of PEMSEA's capacity development approach and programmes to take advantage of the latter's existing capacity development working modality, facility and experience with minimum modifications to meet its global requirements. PEMSEA's tested training approach could be easily replicated but modified as needed and adapted to meet the varying conditions of the concerned regions.